2002 REPORT ON
ORANGE COUNTY, CALIFORNIA INFRASTRUCTURE

OCTOBER 10, 2002

Organized by Civil & Environmental Engineering Affiliates and
the Department of Civil & Environmental Engineering, University of California, Irvine

In cooperation with American Society of Civil Engineers - Orange County Branch,
California Rebuild America Coalition, Center for a New Orange County,
and Orange County Business Council
MISSION STATEMENT

Civil and Environmental Engineering Affiliates

The purpose of the UCI Civil & Environmental Engineering (CEE) Affiliates is to provide an effective means to offer support and guidance to the Department, its programs and students, and to act as an interface between the professional civil and environmental engineering community in Southern California, particularly in 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.

PARTICIPATING ORGANIZATIONS:
Table of Contents

Executive Summary

Report Card For Orange County’s Infrastructure

A. Subject-Issue Brief
   • Aviation
   • Parks, Recreation, and Environment
   • School Facilities
   • Solid Waste
   • Transportation
   • Urban Runoff / Flood Control
   • Wastewater
   • Water

B. Working Committee and Review Council Members
Executive Summary

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 its financial troubles of mid 1990’s and therefore needs to plan all of its infrastructure investments very carefully. This is an important issue especially in terms of infrastructure maintenance. One of our main goals in developing such a report card was also to help encourage development of a life cycle approach to infrastructure maintenance. It is much cheaper to repair and maintain an infrastructure on an ongoing basis rather than replace it when it reaches the end of its useful life and becomes functionally obsolete.

Over the next 20 years, Orange County is expected to grow at a rapid pace. The Orange County Business Council estimates about half a million additional residents and more than half a million new jobs will be added to the County. Orange County is also transitioning from a suburban county to an urban county and ranks third most densely populated counties in the U.S. Also, our infrastructure and transportation system have not kept up with the demands of rapid growth. The average daily two-way commute time for Orange County residents is 74 minutes.

To keep pace with our expected growth and to ensure that Orange County continues to provide the optimum quality of life that its residents have come to enjoy and expect, we felt compelled to develop a report card with the following objectives in mind. These were:

- To Assess the state of our infrastructure
- To properly plan for the future
- To develop timely and adequate funding opportunities

We decided to model our efforts on the ASCE national’s report card and as such embarked on developing the report card infrastructure. First, we set up our Executive Committee comprised of key members from both the public as well as the private sector. One of the Executive Committee’s main tasks was to develop a methodology and approach including a grading policy that would serve as the overall methodology for all eight infrastructure groups. We deemed this as an important task to ensure integrity and uniformity in the way each group approached the task at hand. The Executive Committee also met with representatives from ASCE’s national leaders who reviewed and approved our overall methodology. The Executive Committee’s other tasks included the overall administration and management of the report card effort.

Next, we established Infrastructure Working Group Committees for each of the eight infrastructure categories. These committees were charged with customizing the overall methodology to their respective infrastructure category as well as gathering, and analyzing data, compiling the results and developing the first draft of the their reports.
We also formed review bodies for each of the infrastructure groups, called Expert Review Councils. The Review Councils reviewed and approved individual infrastructure methodologies, participated in key discussions, finalized the reports, as well as developed policy options and statements for their respective infrastructure category.

This report represents the dedicated work of hundreds of volunteers from the public and private sectors in Orange County. These individuals worked tirelessly over a period of close to one year to develop, refine, and finally unveil the results on October 10, 2002.

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 good. Much work needs to be done on the local and county-wide level to improve the grades. Our plan is to revisit the issue of the report card in two years.

In the mean time 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 every day lives.

Yazdan T. Emrani, P.E.  
Chair, Report Card Executive Committee  
Immediate Past President of Civil & Environmental Engineering Affiliates  
University of California Irvine

Jan Scherfig, Ph.D., P.E.  
Past Interim Chair Department of Civil & Environmental Engineering  
University of California Irvine
# 2002 REPORT CARD
for Orange County’s INFRASTRUCTURE

<table>
<thead>
<tr>
<th>Subject</th>
<th>Grade</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aviation</td>
<td>C+</td>
<td>Orange County’s aviation demands are forecasted to be 37 million annual passengers by the year 2025. Our challenge is to balance these needs with long term solutions to address commercial air and air freight demands.</td>
</tr>
<tr>
<td>Parks &amp; Recreation Facilities</td>
<td>C</td>
<td>To date PR&amp;E has not been considered as a component of infrastructure. This makes funding the number one critical challenge to PR&amp;E when there is a competitive rivalry for dollars and resources with other mandated functions of government.</td>
</tr>
<tr>
<td>School Facilities</td>
<td>D+</td>
<td>Due to aging, or outdated facilities, or overcrowding, a significant portion of Orange County’s public school buildings are deficient and will become more so without increased investments. Excellance in education rests directly on the foundation of adequate infrastructure.</td>
</tr>
<tr>
<td>Solid Waste</td>
<td>B</td>
<td>Public debate is ongoing over the location and use of Orange County’s landfills, processing plants and transfer stations. Proper planning at this time will ensure the adequacy of this vital infrastructure for the future.</td>
</tr>
<tr>
<td>Transportation</td>
<td>C</td>
<td>To continue maintaining and improving our transportation system, we need another similar funding source like Measure M. Without adequate future funding to Measure M for transportation improvements, there is no doubt that as the population increases in the County, gridlock will set in.</td>
</tr>
<tr>
<td>Urban Runoff / Flood Control</td>
<td>D</td>
<td>Facing budget shortfalls and increasing need for investment in deficient facilities requires innovative approaches such as creating stormwater utility Districts to raise revenues for much needed and costly stormwater infrastructure projects.</td>
</tr>
<tr>
<td>Water</td>
<td>B</td>
<td>Although currently graded at B, Orange County’s 7,500 miles of water main and 300 potable water storage tanks face enormous challenges in the next decade. These challenges include aging infrastructure, shrinking sources of water supply, water quality, and overall system reliability.</td>
</tr>
<tr>
<td>Wastewater</td>
<td>C+</td>
<td>Orange County’s 7,000 miles of collection system sewers and 240 pump stations face enormous needs. Just to maintain the wastewater system at its present grade plus meeting the standards required by existing and new federal regulations will require continued and consistent investments.</td>
</tr>
</tbody>
</table>

Orange County’s Infrastructure G.P.A. = C

A = Exceptional
B = Good
C = Fair
D = Poor
E = Inadequate

Each category was evaluated on the basis of:
- condition
- capacity
- operation
A. Issue Briefs
I. Introduction

Facilities for commercial, general and military aviation have been a part of the Orange County scene since before World War II. Since then, the County has been one of the most rapidly growing urban areas in the United States. In the most recent 10-15 year period, the County’s growth has generated a requirement for additional commercial and general aviation facilities based on an upwardly spiraling demand for air travel in the County and surrounding region that mirrors a similar growth in demand for air transportation nationwide. The County’s need to satisfy this growing need for air transportation service is not just important to the local demands and quality of life in the County, but is also crucial to satisfying the needs of the national system of air transportation and aviation technology.

II. Overall County Grade

The overall grade for the County was reached through quantitative and qualitative judgment of the three active airports in Orange County; John Wayne Airport (JWA), Fullerton Municipal Airport and Los Alamitos Army Airfield. All three airports were evaluated using the same three fundamental criteria, condition, capacity and operation, as the other infrastructure categories included in the development of the Report Card. Each component was weighted equally.

The Aviation Working Group, in its effort to best translate the data assessment into a single letter grade for the County’s aviation infrastructure, expanded the capacity component to better define actual historical conditions at JWA. It then derived the overall grade for JWA capacity using the following letter/numerical relationships:

\[ A = 4; \quad B+ = 3.5; \quad B = 3; \quad C+ = 2.5; \quad C = 2; \quad D = 1; \quad D- = .5 \]

Based on the process for quantifying the grade, the County is assigned an overall grade of “C+” for its aviation infrastructure.
The detailed grades for each of the three airports were:

<table>
<thead>
<tr>
<th>Condition</th>
<th>JWA</th>
<th>Fullerton</th>
<th>Los Alamitos</th>
<th>Overall County</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B+</td>
<td>B</td>
<td>B+</td>
</tr>
<tr>
<td>Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Present with Restrictions</td>
<td>C+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Present w/o Restrictions</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Future with Restrictions</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Future w/o Restrictions</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operations</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

**THE OVERALL COUNTY AVIATION GRADE IS C+**

### III. Policy Options and Recommendations

The aviation resources/assets in the County were evaluated on the basis of condition, capacity and operations. Facility conditions at the existing operational airports are considered to be excellent, with adequate annual funding for maintenance and repair and evidence of highly effective facilities management priorities.

Additionally, the data provided indicates that present general aviation operational capacity needs are being satisfied. Waiting lists for tie downs, hangar space and/or other general aviation related facilities and services are very short. However, no international commercial flight capability is being provided at any of the three operating airports in Orange County. Therefore, Orange County does not contribute to the satisfaction of either local or regional demand for direct international air travel. Presently, there are no plans to redesignate current capacity or to build new capacity to satisfy the projected future demand for international travel.

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 provides the flight and expansion constraint limits under which John Wayne Airport currently operates. John Wayne Airport has adequately planned and expanded to meet present and future air travel demand within the constraints referred to above, as well as those imposed by local public opinion. 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.
All airport resources at all three airports are operated well within FAA standards and are in compliance with other environmental and safety standards.

IV. Infrastructure Assessment Methodology

Background

Three active aviation facilities are operational in Orange County. They are John Wayne Airport, Los Alamitos Army Airfield and Fullerton Municipal Airport.

John Wayne Airport is the most significant with respect to operations because it is the only one of the three Orange County airports that serves both commercial and general aviation operations. General aviation aircraft generate approximately eighty percent of John Wayne Airport’s take-off and landings.

Los Alamitos Airport is presently operated as the Los Alamitos Army Airfield and is the home base for operations of certain units of the California National Guard and the Army Reserve. Practically all operations are conducted by units of the California National Guard and Army Reserve.

Fullerton Municipal Airport has approximately 91,000 general aviation operations annually and, along with JWA, provides the County with all general aviation facility assets.

Methodology

The Executive Committee of the UCI Affiliates Report Card Committee has established criteria for developing report card grades in each infrastructure category, including aviation, and has specified that consideration should be given to three fundamental components within each category. These fundamental components, which are weighted approximately equal (30% each), are condition, capacity and operations.

The Aviation Infrastructure Working Group (“AIWG”) developed a methodology for evaluating and assigning a grade to Orange County aviation infrastructure assets. That methodology includes analyzing data obtained by the use of an objective questionnaire, other relevant reports and materials, and supplemented by visual inspection.

A 12-part questionnaire was sent to the managers and operators of each of the three Orange County airports to gather the initial data. The questionnaire was designed to highlight pertinent macroscopic data about each airport and to provide crucial information related to the three components selected for consideration. 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 used to supplement the data collection effort and provided a visual verification of infrastructure conditions, capacity and operations. The AIWG analyzed each Orange County airport 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.
V. Data Gathering and Sources

The twelve-part questionnaires served as the primary data-gathering tool. Other publicly available information and data relative to condition, capacity and operation of each airport were also selectively reviewed. Visits were made to each airport to visually assess live operations and existing facility conditions. There were extensive discussions with operations personnel, planning staff and maintenance personnel.

VI. Results and Conclusions

**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 facilities condition without affecting capacity. Proactive facilities maintenance management practices are in existence and have been for several years. Facility conditions at the other two Orange County airports, Fullerton Municipal Airport and Los Alamitos Airport, are also in excellent condition.

**Capacity:** Existing general aviation capacity at the two airports which have such operations, John Wayne Airport and Fullerton Municipal Airport, appears adequate to satisfy present demand. General aviation future demand indices do not project a future need for capacity beyond that currently provided. Neither airport has plans for expansion of general aviation facilities.

John Wayne Airport is the only airport of the three Orange County airports with scheduled commercial service. The commercial service at John Wayne Airport is limited to building to less capacity than demand requires. Future building programs continue to stop far short of reaching future demand capacities for both foreign and domestic commercial service and air freight.

The Regional Aviation Plan for the 2001 Regional Transportation Plan (RTP) published by the Southern California Association of Governments forecasts the demand for the region to be 167 million annual passengers by the year 2025. This document also suggests certain demand quantities for parts of the region including Orange County. That demand distribution envisions approximately 37 million annual passengers in 2025 for the County as its fair share of that predicted future regional demand. This equates to the County servicing approximately 18% of the region’s demand in 2025. At the present time the County is constrained to serve only 8.4 million annual passengers which is about 10% of the regional demand compared with a “fair share” service of approximately 20%. This translates into the County having a capacity to serve only about one half of its fair share portion of the present regional demand. If these demand figures are projected to 2025 then the County’s portion of regional demand would be about 37 million annual passengers and with the capacity to serve only about 25% of the County’s fair share of regional demand.
**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 commendable 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. For the past four years the Airport has not received a single non-compliance citation.

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 has provided a similarly aggressive program to achieve these facilities improvement objectives, to limit the confusion of pilots and reduce the probability of runway incursion by smaller aircraft. This is extremely important at JWA because of the unusual 80:20 ratio of general aviation to commercial operations.

Equally significant in defining operational performance has been the Airport’s activities and achievements related to restoration of the number of commercial operations and passenger counts which plummeted with the September 11 terrorist attacks on the World Trade Center and which precipitated other calamitous affects on U.S. air travel, airlines and airports. John Wayne Airport was one of the first U.S. airports handling sizeable commercial passenger loads to regain the pre-September 11 levels. JWA 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. This aggressive and highly commendable management approach has placed the airport in the unique position of achieving federal compliance for the installation of Explosive Detection Systems by December 31, 2002. Achieving these actions not only will enhance the airport security at JWA but will, as a parallel benefit, cause the commercial air traveler processing through the airport and boarding aircraft virtually no additional delays.

**VII. References**

- Southern California Association of Governments Regional Aviation Plan for the 2001 Regional Transportation Plan (RTP)
- Federal Aviation Administration Circulars
- Data Survey
- Airport System Master Plan
- Environmental Impact Report 753
- Environmental Impact Report 582
1. What is the current value of all real property in current inventory?

<table>
<thead>
<tr>
<th>Land:</th>
<th>Acres</th>
<th>Original Value</th>
<th>Current Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land:</td>
<td>Acres</td>
<td>Original Value</td>
<td>Current Value</td>
</tr>
<tr>
<td>Buildings/Facilities:</td>
<td>Quantity</td>
<td>Original Value</td>
<td>Current Value</td>
</tr>
</tbody>
</table>

2. Have you grouped your facilities and infrastructure inventory into categories other than those shown in Question 1 above? If yes, please list.

3. What is the value of deferred maintenance for the inventory? (Deferred maintenance is defined as that maintenance and repair which should have been accomplished but was not for insufficient funds or other reasons and has left certain elements of the Infrastructure/Facilities Inventory in a state of maintenance below that established for effective operation and quality of life.)

4. Without any deferred maintenance to correct, what is the annual cost of maintenance and repair to keep the entire inventory in the desired state of maintenance?
5. Give actual budget amounts spent for maintenance and repair of the Inventory for each of the last five years.

6. Are other funding sources available for maintenance and repair projects? If yes, please list.

7. Does the facilities management process utilize the funding sources listed in Question 6 above?

8. Does the present Facilities/Infrastructure Inventory contain adequate capacity to meet present population demands and meet functional requirements?

9. Do the planning and programming processes establish a construction and acquisition program to meet future capacity needs in 10 years? In 25 years?

10. Has the inventory suffered breakdowns or outages and lost (temporarily or permanently) capacity in the past five years? If yes, please describe.

11. Has any operation or process been stopped or cited due to lack of compliance with Environmental, HAZMAT, Safety or ADA statutes or directives? If yes, please describe.

12. What part of the annual maintenance and repair programs is outsourced or privatized?
I. Introduction

Parks, Recreation, and Environment (PR&E) is a quality of life issue affecting our physical and psychological well-being, social/cultural awareness, economic productivity, and ecosystem sustainability. Aldo Leopold expressed, “recreation is valuable in proportion to the intensity of its experiences, and to the degree to which it differs from and contrasts with workaday life”.

The Working Group/Review Council applauds and commends the engineers involved in this local effort for including PR&E as one of the critical infrastructure components. It was not a classification when the national effort was undertaken and completed.

In one respect, Orange County is fortunate to have such an array of resources. For a population of 3 million within 798 square miles, there are approximately 115,000 acres in public open space. Cleveland National Forest covers approximately 55,000 acres within Orange County’s boundary. State Parks manages approximately 9,900 acres. The 43,000 acres under Orange County Harbors, Beaches, and Parks (OCHBP) consists of 28,000 acres of ownership-in-fee and an estimated 15,000 acres in open space easements controlled as “urban edge treatments”. There are approximately 350 miles of trails. The 31 cities within the County contain 7,000 acres. In addition, there is approximately the same amount of acreage in private land conservancies like the Irvine Ranch Land Reserve that comprises 50,000 acres.

In a statewide survey conducted by the California Department of Parks and Recreation in 1992, 76% stated that outdoor recreation is important to the quality of life, 80% said they participate in some sort of outdoor recreation activity, 70% said that more outdoor recreation areas were needed in or near large cities, 66% felt that facilities were often too crowded, 94% felt that environmental protection was an important part of outdoor recreation, and 61% said protection of natural/cultural resources should be increased.

In a survey conducted by the Orange County Families magazine in March of 1999, “parks, playgrounds, bike trails” and other amenities were the second-most important consideration when families choose where to live (second to schools).

II. Overall County Grade

The overall grade for the PR&E infrastructure is a C and it reflects an assessment of facilities and resources far broader than only those directly under the purview of the OCHBP. Our goal was to look holistically at the County as an integrated system of PR&E opportunities - national, state, land conservancy, county, special district, and municipal - from the mountains to the ocean. The study did not include privately maintained and operated park facilities or recreation centers, land reserves, golf courses, marinas, or recreation programming.
Stewardship was foremost in the committee’s deliberations, coupled with sustainability, meeting present needs without compromising the ability of future generations to meet their needs.

Historically, PR&E facilities are not mandated functions of government. They are considered non-essential and discretionary, which puts such PR&E factors as maintenance, rehabilitation, refurbishment, watershed protection, water quality improvement, wildlife habitat protection, regulatory compliance, and capital outlay at risk. This results in reduced levels or elimination of expected services, operation, availability, and recreational uses over resource protection. The main findings and influences in the four PR&E evaluation categories are:

**Condition:** is defined as a physical attribute, predicament, and circumstance of facilities. Condition is a tangible evaluator, often objective and subjective, quantitative, and consumer based.
- County is at a point of diminishing return - aging facilities are deteriorating, refurbishment/replacement costs are rising, and operation/maintenance dollars are decreasing.
- Increased deterioration of facilities renders these facilities less usable by the public.
- Current facilities are not meeting user demand or the capacity factor.
- Costs of planning, designing, permitting, and constructing projects are increasing.

**Capacity:** is defined as the maximum amount or number that can be contained or accommodated at a facility. Carrying capacity is used to assess the number of visitors and the type of visitor activities that can be allowed in a given PR&E facility. Using the concept of carrying capacity will reduce the risk of irreversibly damaging to resources or of diminishing the quality of recreational experiences. Carrying capacity is often intangible and tangible, objective, qualitative and quantitative, and user demand based.
- As our diverse population increases in growth, age, family composition, and distribution, the demand for existing PR&E facilities will exceed carrying capacities.
- Research by the U.S. Forest Service in *Outdoor Recreation in America* predicts PR&E facility usage as a growing consumer demand.
- U.S. Forest Service, in 1989, theorized that the number of people participating in recreation is expected to increase across all activities during the next five decades.
- Lifestyles are changing from rural-based to urban-based.
- As the density of housing increases, the amount of available ‘backyard’ decreases, greatly increasing the need, impact, and demand for community facilities.
- According to the State of California Department of Park and Recreation (DPR), the demand for recreational facilities will exceed existing capacity in areas where development of new facilities will not keep pace with population growth.
- There is a greater number of recreation enthusiasts trying to use the same facilities and/or resources for different purposes.

**Operation:** is performance involving the practical application of principles or processes. Evaluation of the operations of PR&E facilities are intangible, subjective, qualitative, and management based.
- The volume and year-round schedules of sports conflict with the ability to properly maintain and rejuvenate the playability of facilities.
- There is an increased reliance on non-staff labor (volunteers) to accomplish tasks.
- Extensive required environmental monitoring and mitigation measures increase costs.
- Obtaining regulatory permits has become time consuming and burdensome.
- American with Disabilities Act, watershed, water quality, and habitat preservation regulations are notable budget/funding commitments not being addressed adequately.

**Stewardship/Planning:** is defined as care and concern for our surroundings or a community’s or individual’s responsibility to manage their life and property with proper regard to the rights of others, a reflection of community values. This category embodies intangible judgements, often subjective and qualitative, and is value based.

- Agency budgets are decreasing - posing problems as allocations must be divided between various needs including maintenance and rehabilitation of existing deteriorated or outdated facilities, human resources, renovation precipitated by changing regulations and liability requirements, and capital improvements.
- There is a disproportionate relationship between the concentration of population and the distribution of user-based and resource-based resources - especially between North County and South County.
- Currently, OC Natural Community Conservation Planning subregion is a relatively intact and functioning ecosystem that rates as a global ‘hotspot’ of biological diversity and conservation value.
- South County lands contain critical habitats for supporting core populations of seven federally threatened or endangered species.
- Existing lands are providing critical foraging area for one of the last remaining golden eagle pairs in Orange County.
- Rare ecological communities are present within the County, including coastal sage scrub, southern alkali marshes, and native grasslands.
- Creative approaches are needed to increase public awareness and sustainable education as a lifelong endeavor.
- Without stewardship, quality experiences for the County’s users - residents and visitors - are at risk.

### III. Policy Options and Recommendations

Early on, visionary leaders in the County went to great lengths to acquire the park lands enjoyed by today’s generation. For years, this preservation philosophy was a part of the institutional memory and norm. Now, there are inherent dualities within the system. County professionals strive to continually protect and maintain set-aside PR&E resources at acceptable public-use and regulatory service levels within the context of political realities and budget/tax cuts.

“Infrastructure” is rated third in agency budget priorities (behind police and fire). To date, PR&E has not been considered as a component of infrastructure. The inclusion of PR&E in the Orange County Infrastructure Report Card is a reflection and validation of the paramount importance of PR&E as ‘infrastructure’. Funding is the number one critical challenge to PR&E and there is competition rivalry for dollars and resources with other, mandated, functions of government.
Recommendations for improving not only the ‘grade’ but the continued enjoyment of our precious natural and cultural resources include:

- To immediately increase advocacy at the State level for (1) state legislation recognizing PR&E as ‘infrastructure’ and a mandated function of government; (2) PR&E infrastructure funding for Orange County; and (3) consideration to proportion an income stream for maintenance, protection, and creation of PR&E facilities from within other fees as an accessory revenue source.
- To formulate policies within the next year, 2003, at the County and municipal levels that will elevate PR&E as ‘infrastructure’ in the budget process.
- To formulate a citizen committee in the very near future to develop solutions for achieving the goals, strengthen the PLANNING process for the future, and monitor political decisions that may effect the execution of the PLAN.
- To obtain grants within the next year, 2003, for a sustainability education outreach program for classrooms and the community as an adjunct to the President’s Council on Sustainable Development. An informed public is our most powerful resource for meeting the challenges created by increasing environmental, economic, and social equity demands.
- To encourage PR&E agency professionals at all levels to (1) effectively convey the tangible and intangible values of PR&E, (2) be stewards of the PR&E system without political repercussions or consequences, and (3) innovatively look at creative and entrepreneurial financing to accomplish goals for the future.
- To distribute the Report Card in utility bill mailings within the first two months after the Congress announcement to enlighten the public-at-large.

IV. Infrastructure Assessment Methodology

Our process was evolutionary. Four intuitive think tank sessions were conducted through the months of June, July, and August of 2002. As a baseline, the Working Group contemplated numerous beneficial definitions and mission statements from numerous agencies and organizations providing facilities within Orange County.

The evaluation criteria for PR&E followed the three primary categories of Condition, Capacity, and Operation. The PR&E working group then added a fourth category, Stewardship/Planning, to emphasize infrastructure commitment for the future. Each classification was further divided by type of facility, user-based (those facilities that have human interaction, ie: parks) and resource-based (those facilities and open spaces preserved for habitat sustainability and experiences). The ‘grades’ for each of the category and classification combinations are presented in the matrix below:

<table>
<thead>
<tr>
<th></th>
<th>Condition</th>
<th>Capacity</th>
<th>Operations</th>
<th>Stewardship/Planning</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>User-based</td>
<td>C</td>
<td>D+</td>
<td>C+</td>
<td>C-</td>
<td>C-</td>
</tr>
<tr>
<td>Resource-based</td>
<td>C</td>
<td>C</td>
<td>C+</td>
<td>C+</td>
<td>C+</td>
</tr>
</tbody>
</table>

THE OVERALL COUNTY PARKS & RECREATION GRADE IS C
V. Data Gathering and Sources

The PR&E evaluation process was greatly facilitated by the broad knowledge, experience, and qualifying credentials of members of the Working Group, technical advisors, and Review Council. Several documents, cited in References, were examined to quantify a baseline of the trends and opinions related to PR&E.

An interactive session, entitled ‘Are Your Parks Hitting the Mark’, was conducted on Thursday, August 1, 2002, at the Costa Mesa Neighborhood Center. Invitation flyers and materials were sent to the thirty (30) directors of City parks, recreation, and community service departments within Orange County.

VI. Results and Conclusions

Numerous studies repeatedly demonstrate that there are as many intangible values (quality of life, health and wellness, human development) as there are tangible values (jobs, resource protection, species diversity) associated with outdoor recreational pursuits that not only affect but play a significant role in fashioning an individual’s personal development and growth as a future leader in society. These include responsibility, attitude, teamwork, self-confidence, and cognitive efficiency (to name a few). Participation at PR&E facilities should be viewed as a means for optimizing personal beneficial outcomes.

The 1993 State of California DPR Assessment of California’s Local Park and Outdoor Recreation Infrastructure stated the following as the leading factors most negatively affecting agencies’ ability to fund PR&E rehabilitation: inadequate availability of state grant money, escalating expenses for operation and maintenance of labor and utility costs, and escalating capital costs for repairs, materials, and equipment.

Holistic improvement of PR&E facilities and resources are dependent on facilitating seamless solutions among agencies and infrastructure components; changing public and political perceptions into reality regarding benefits to health, safety, and welfare; developing practical solutions for rehabilitating and maintaining current resources; providing suitable non-vehicular connectivity between resources; protecting the County’s indispensable natural and cultural resources; and synergistically orchestrating the cost benefits derived from PR&E in relation to other infrastructure allocations.

California Department of Park and Recreation’s publication, Seventh Generation, prescribes that change is inevitable and that vision attempts to predict and manage that change. Generations are identified by their art, culture, and customs. Will we repeat history? Will the Eco-boom generation be the leaders for change? Will there be the political support and funding to maintain and/or develop facilities in direct proportion to population growth?

The issues, concerns, and recommendations presented herein can either be a problem OR an opportunity - to change the face of the future for Parks, Recreation, and the Environment in Orange County.

PR&E facilities not only create community, they will become the community. The Great Law of the Iroquois Confederacy maintains, “in our every deliberation, we must consider the impact of our decisions on the next seven generations”. Orange County must adopt the same philosophy.
VII. References

• California Park & Recreation Society, *Facilities Inventory Survey* 1999


• County of Orange Public Facilities and Resources Department, *2002 Business Plan*

• County of Orange, *Recreation Element*.


VII. References (continued)


• U. S. Department of Interior, *National Park Service Strategic Plan, 2001 - 2005*


• U. S. Fish and Wildlife Service, Division of Ecological Services, *Habitat as a Basis for Environmental Assessment*, 1980


I. Introduction

Children are our most valuable resource. Providing facilities for the education of our children has been a charge of the public domain since the founding of this country and is considered as important a part of the public infrastructure as is providing for major civil works. While the state of infrastructure elements such as utilities and transportation will affect the present quality of life, the education provided by our public schools provides the foundation for our continuing freedom and prosperity. The nature and quality of our educational facilities have a dramatic effect on students, their teachers and, ultimately, our future.

Orange County California has experienced great population growth during the past quarter century. There are presently more residents in Orange County than there are in 20 of the 50 states in the U.S. The present County population is in excess of 2,800,000 and continues to grow at a substantial rate.

The population centers in Orange County have spread south and southeast from older communities along the coast and in the northern areas of the County, adjacent to Los Angeles County. Many schools in the older communities are out-dated, with a growing mixture of new additions and improvements in an effort to keep pace with increasing demand for more classrooms while attending to the deterioration of aging facilities. Because of the rapid population growth and limited funding resources, many schools are subject to classroom overcrowding and shortage of spaces for ancillary needs, in addition to the effects of aging, outmoded facilities.

There are 28 public school districts in Orange County, providing grades K – 12 education in a variety of settings. The unified school districts provide education in elementary schools, middle schools and high schools. Other districts offer only one or two levels of education. Ability to fund capital projects varies among districts, with some receiving substantial financial support from individuals or civic groups, while others receive very little supplementary funding and must depend upon public funding for all needs. This competition for funding can place very large or prosperous districts against districts with comparatively small student enrollment.

The characteristics of population growth and settlement within Orange County have provided general guidelines for viewing the differences among school districts.

- North County - older schools, more ethnically diverse and generally less affluent neighborhoods.
- Mid County - mix of old and new schools, mix of neighborhoods where some wealthier communities provide funding support for schools.
- South County - rapid recent growth and primarily new schools.
This Report Card for Orange County Schools is based upon school district responses to a data survey questionnaire that was sent to each school district. While survey responses have not been received from all school districts at the time of preparing this report, the evaluation and grading for Orange County schools has been made from data that has been submitted and from other information that has been available. The grade evaluation is for all schools in Orange County, viewed as a single entity. This present Report Card is only a beginning. We look forward to the time when there will be sufficient information to evaluate and grade each school district, and perhaps each school.

When considering older districts in North County, the wealthier Mid-county districts, and the newer neighborhoods in South County, combining survey and published information, the overall grade presently assessed for Orange County schools is D+.

II. Overall County Grade

Of the mixture of buildings throughout Orange County, there is high proportion of older buildings, which tends to bring the average grade component for “condition” down. Facilities directors overseeing older schools are continuing to play “catch-up”, while those building newer schools have difficulty in avoiding obsolescence before completion of construction. While most high schools have digital education capacity, incentives are still needed for middle and elementary schools to use interactive, computer-oriented instructional curriculum. Too few schools of any type are provided with high-speed internet access using T-1 fiber optic cable for broadband service.

The grade component for schools “capacity” is driven by a shortage of necessary classrooms both in place and in the funding pipeline. Classroom overcrowding is particularly notable in minority communities, and the older districts have a high percentage of year-round schools. Nearly all campuses, except a few of those newly constructed in new South-County developments, have portable classrooms (trailers).

Schools “operation” does not reflect upon the management skills or dedication of those managing facilities, but is a factor of the shortfall of maintenance funding. The grading component attributed to “operation” is low because of poor finishes, lack of air conditioning even in year-round classrooms, poor building services in older facilities, and the preponderance of portable classrooms throughout the County.

When averaging all three components, condition, capacity and operation, the overall grade for Orange County Schools Infrastructure is disappointing:

THE OVERALL COUNTY SCHOOL FACILITIES GRADE IS  D+
III. Policy Options and Recommendations

As with any buildings, new school construction and/or physical improvements, adequate maintenance of existing facilities all require sufficient funding and intelligent funding management. Subject to conformance with State and Federal Guidelines, individual school districts currently have control of funds received for capital improvements and operation. School districts do not have a lot of control in regard to population changes and basic teaching requirements, nor do they have very much control of the amount and timeliness of capital improvement funding and operational funding.

In November 1998, the voters in California approved Proposition 1A, known as the School Facilities Program (SFP), which has provided over $6 Billion for new construction and modernization. Although this funding source has been nearly depleted, the majority of Orange County school districts are eligible to receive from the State a 50% matching grant for the cost of new construction and 60% of the cost for modernizing older facilities.

State funds for matching grants are not always available when needed. There can be long delays due to timing of bond sales, and bond proceeds may not be available for the amounts needed. Recent legislation has enabled individual school districts to obtain project funding through the sale of general obligation bonds with the approval of only 55% of the voters. This legislation makes it less difficult for school districts to obtain their share of matching funds and to obtain their own funding when there are shortages of State funds.

The State also has a limited funding resource for Deferred Maintenance. School districts with growing populations find that the fees charged to housing developers are another resource for capital funds. Charter schools are beginning to become popular as alternatives and City governments may also be sources for school project funding. Some municipalities establish special funding districts for schools, such as the Newport Coast Communities Facilities District. Mello-Roos, a form of establishing a special taxing district in new communities, has been used for school funding in a number of instances. FEMA is a resource for emergency repair funding after catastrophic events.

The State Infrastructure Bank, a Bill currently in progress through the State Legislature, is expected to be a viable source of funding for K – 12 schools as well as universities.

Proposition 47, the Kindergarten-University Public Education Facilities Bond Act of 2002, was assessed in 2002 by California voters. This Act is intended to provide $13 Billion for new construction, improvements and repairs at elementary, middle and high schools, community colleges and universities. The impact of this funding has not been evaluated for Orange County school districts.

The impact of these funding programs should be evaluated in regard to information discovered by the recent survey conducted for school grading. In light of reported information about school operations, there is also a great need for evaluation of policies connected with funding for facilities maintenance as well as better use of population growth projections and estimates for future classroom requirements. Reliable estimates for repair, upgrading and replacement are especially important for the increasing number of aging buildings with deferred maintenance – including deteriorated portable classrooms.
IV. Infrastructure Assessment Methodology

The Schools Working Committee evaluated Orange County school facilities according to three criteria: 1) Condition; 2) Capacity; 3) Operation. The committee developed an extensive survey questionnaire with these criteria in mind and sent it to each of the 28 district school superintendents. Responses were reviewed in developing a grade for representative schools in the County basing one-third of the grade on each of the three criteria, considering the following:

**Condition:** Considers the nature of facilities in terms of codes and regulations for life and safety, accessibility, environmental conditions and spaces for education enrichment programs. Most new schools include features conforming to codes and building accessibility requirements. Older schools require repair, improvements and upgrades. Compounding the physical deterioration of older schools are the changes in instructional methodology which have rendered many of these facilities antiquated and ineffective for instructional challenges of the 21st century. Those challenges include present uses of electronic multi-media systems and computers as both instructional and interactive programs as part of the curriculum learning tools.

Accessibility features should include conformance with requirements of the Americans with Disabilities Act (ADA), and other features such as curbside zones for student drop-off/pick-up and on-site school bus zones. Specific ADA requirements relate to wheelchair ramps at sidewalks and building entrances, as well as wheelchair access to all building levels, to classrooms, and to washroom facilities.

Environmental features should include both exterior and interior items such as: campus and playground overcrowding due to need for portable classrooms; adequacy of off-street parking; and campus locations free from heavily polluted atmospheres, high noise levels or electromagnetic effects from overhead power lines. The interior environment includes the nature of interior finishes, the quality of lighting, public address/communication systems, as well as adequate ventilation and temperature control systems.

Life and safety systems should include structural resistance to earthquake forces, smoke detectors and fire alarm systems, fire suppression devices, adequacy of exitways and doorway hardware.

Security features should include grounds fencing and gates, exterior night lighting, security control at entranceways and surveillance systems.

Education enrichment features should include such items as classrooms equipped for computer-oriented education, special rooms or spaces for science laboratories, art, music, shops, etc. These features also include common area facilities, such as libraries, gymnasiums and auditoriums.
Capacity: Considers the number of classrooms for housing total student enrollment at each school, or the number of students for each classroom. Even though most school districts have been faced with growing enrollment, a number of districts in Orange County have adopted class-size reduction programs. The smaller number of students in each classroom yields a smaller student-teacher ratio, providing better opportunity for teachers to address individual student needs and to provide an increased quality of teaching. The decrease in adopted class size, coupled with increasing population growth, has caused a greater demand for more classrooms.

Orange County schools have faced formidable challenges in addressing overcrowding conditions for the past 20 years. School districts in central Orange Country, such as Santa Ana, Anaheim and Newport Mesa, have experienced dramatic demographic changes. For example, the population density in Santa Ana rivals the density in the Borough of Manhattan, New York. Many of these urban school campuses have been forced to use playground areas as locations for portable classrooms. School districts have found that portable classrooms are an expedient means for rapidly creating more classroom capacity. Consequently, many school campuses have temporary, portable classrooms as a major facility component to supplement permanent classrooms and support facilities. *These lightweight structures deteriorate rapidly but continue in use well past their effective life.*

Because of the uncertainty in the availability of public funds, the funding amounts made available and the time required for funding acquisition, many school districts use a planning and funding cycle of 10 years. For that reason, the Committee’s grading evaluation includes consideration for current school district funding programs.

Operation: Considers the level of functionality and quality of maintenance provided at the school facilities. The State of California has established 25 years as the useful life of a school, at which time the school is eligible for renovation and modernization. By this standard, some of the older schools in Orange County are eligible for a second, even third, round of renovation. Because of ever-changing educational programs and the level of deterioration of aging buildings, it is becoming more difficult and expensive for older schools to become the physical equal of the newer schools. Operating deficiencies are further affected when school districts are unable to fund necessary maintenance with regularity.

Perhaps the most prevalent problems of maintenance deal with the building envelope – the exterior walls and roof. The primary function of a building is to provide shelter from the weather. Too many schools have leaking roofs, weather infiltration around doors and windows, plus peeling of exterior paint.

Interior finishes are extremely important because the interior environment surrounds our children and their teachers for a good portion of each day. It is this environment that can inspire or diminish the will to learn. Even the exterior areas of a school campus require attention. Landscaping requires watering and trimming; hard-surfaced areas should be sealed, and small damages should be promptly repaired to prevent major damage.

Beyond the visible exterior, there are concealed but aging plumbing pipes and plumbing fixtures that require repair or replacement. There are electrical wiring systems that become over-loaded or shorted out due to decay. There are mechanical systems with wearing parts, requiring adjustment or replacement.
In addition to evaluating the primary criteria based on responses to surveys, other research was pursued. The Schools Working Committee reviewed published district improvement budgets, published bond resolutions, self-evaluated curriculum report cards and talked with school officials.

Committee members also visited 20 school campuses in various locations throughout the county. Campuses visited represented elementary, middle and high school facilities and contained buildings ranging from one year to 76 years old. Two of the schools visited were initially planned, and totally wired to provide E-learning opportunities, though more were being upgraded to provide 21st Century computer labs in older buildings. In at least one case, it could be seen that available funding was rightly directed to the type of upgrades that would modernize the existing permanent structures and add significant value to the curriculum, whereas items such as painting or cosmetic treatments had been treated as a lower priority and left undone. In another case, new buildings have been added for 21st Century learning. Also, in mentioning permanent structures, it must be noted that, on those 20 campuses, the committee counted 249 portable buildings (trailers). On at least two of the campuses, portable buildings were being used for other programs, in some cases curriculum-related and other cases not. Please see the published ‘Citizens’ Guide to Renewing Orange County’s Infrastructure’ for case studies on two school campuses.

V. Data Gathering and Sources

This brief has been prepared through volunteer time and efforts by members of the Schools Infrastructure Working Committee and the Review Council. The Working Committee was composed of the following experienced professionals, knowledgeable in the functional requirements for school facilities.

- An architect, with specialization in school planning and design as a primary service.
- A director of facilities, transportation and security from one of the Orange County school districts.
- An architect and engineer, with extensive school design and construction background, currently providing forensic evaluation of buildings as a primary service.
- An architect, with specialization in government contracts and project management.
- A professional engineer, specializing in facilities management.

The Review Council function was performed by a highly regarded Orange County public servant who has made public service an avocation and career focus, and by the founding principal of a highly regarded Orange County facilities management firm.

As previously noted, each school district in Orange County was provided a School Survey Data questionnaire for its reporting to the Working Committee. Additionally, the Committee reviewed available planning reports and current improvement funding requests prepared by several of the school districts. There have also been discussions with some of the school district superintendents and school visits by members of the Working Committee. Information gathered from these resources has been reviewed and evaluated by the Working Committee in developing a grade for Orange County schools.
VI. Results and Conclusions

**Condition:** There is a general shortage of spaces for educational enrichment programs, such as art, music, and indoor athletics, especially for the lower grades.

Older schools are generally far behind in providing the modern teaching features offered at newer schools. There are also shortages of teacher lounge facilities and quiet areas for teaching breaks.

Older school facilities are plagued with ineffective heating and cooling systems, in some cases causing physical discomfort to students. The condition of building finishes, especially in older schools, can be demeaning for some students and a distraction for others.

Especially distracting for both students and teachers are the conditions of portable classrooms. These are often noisy places, with ventilation, heating and cooling difficult to control. Interior teaching systems and finishes are typically below new standards.

**Capacity:** There are still many school districts targeting 30 – 35 students per classroom as an acceptable student load for teachers. Kindergarten and some lower grade classroom loads are more frequently targeted at 20 to 25 students, even if only half-day sessions must be scheduled to achieve these goals.

In order to minimize the need for additional classrooms, several districts have studied the cost-effectiveness of scheduling year-around school sessions. The reported conclusion of these studies is that there will not be a cost reduction for the district.

A number of school districts do not have aggressive, updated programming for obtaining additional necessary classrooms in the near future.

There may be a general County-wide failure to fairly assess the movement and changing school needs of the population. An example of these changes would be the leveling off in demand for elementary grade classrooms and the increasing demand for high school facilities, as the surge in population growth from the 1980’s moves through higher grade levels. Effects of this nature, coupled with changing demographics of neighborhoods, can have greater effects on school capacities than presently envisioned by some districts.

**Operation:** Deteriorated physical conditions are prevalent at schools throughout the County, especially in the older districts. Most school districts have both old and new buildings intermixed on the same campus.

Maintenance of portable classrooms is a major problem as they are designed for a relatively short useful life and require considerably more maintenance than for permanent construction. Some “portable” classrooms have been in place for over 25 years, sporting leaky roofs, walls and windows and are generally unacceptable for use as teaching facility.
VII. References

- Survey Questionnaire/Data Sheet Responses
- Selected School District Capital Improvement Budgets
- Interviews with selected School District Officials
- Sample School Campus Visits
- Orange County Board of Education
- Self-reported Academic Report Cards
- School District Websites
I. Introduction

The solid waste management system infrastructure in the County of Orange provides an essential public service to its citizens. There are three basic components of the solid waste management system: collection of solid waste, processing the solid waste to remove recyclable materials, and disposal of solid waste that cannot be recycled (residual waste). These three components work together to ensure that the integrity of the solid waste management system is maintained for Orange County citizens, now and into the future.

Timely and adequate collection of solid waste ensures public health and safety. Processing waste involves the systematic separation and removal of recyclable materials and illegally disposed hazardous waste from the solid waste stream prior to landfill disposal. Removing recyclable materials conserves scarce natural resources and assists Orange County jurisdictions in meeting State waste diversion mandates. Removal of hazardous waste protects the groundwater and precious water resources, as well as reduces the jurisdictions’ environmental liability. Disposal of solid waste in environmentally sound landfills protects public health and safety. Additionally, long-range capacity planning is key to a properly managed landfill system.

II. Overall County Grade

Orange County has a sound solid waste system. Orange County has achieved its good solid waste system through the vision of leaders who planned for future growth, built infrastructure, formed strategic partnerships with cities and waste management companies, promoted prudent financial planning, and secured community support.

THE OVERALL COUNTY SOLID WASTE GRADE IS  B

III. Policy Options and Recommendations

Notwithstanding its present favorable state, there are significant challenges that must be addressed to ensure that the system continues to provide the high level of service expected by the residents of Orange County.

The management of waste is highly regulated. The stringent environmental regulations related to air, water, and land resources have significantly increased costs in the last ten years. Rapid development and the continuing urbanization of Orange County are encroaching on formerly remote landfills. Material Recovery Facilities and waste transfer stations are surrounded by neighborhoods and exist within industrial parks. With the close proximity of neighbors, the control of noise and odor requires expensive investment in odor control technologies, sound buffering, and continuous monitoring of conditions affecting neighbors.
Community acceptance of the facilities necessary to sustain the waste management system is vital. Open and honest communication between regulatory agencies, City and County officials, and the public is a high priority. Communication and mitigation of community concerns by facility operators foster acceptance of necessary infrastructure. Emerging technologies will require more outreach into the community if they are to be successfully implemented. Existing infrastructure concerns include these needs:

- The County’s long-term strategic plan to expand existing landfill capacity needs to be implemented.
- Material Recovery Facilities need to be expanded.
- New technologies need to be studied and implemented if found feasible.
- Waste reduction and diversion strategies must continue to be pursued.

**IV. Infrastructure Assessment Methodology**

Solid waste management is comprised of waste collection, processing for removal of recyclables, and disposal of residual waste. Refuse haulers collect solid waste in collection vehicles designed for residential waste, commercial waste, and construction and demolition waste. Collected waste is then transported to Material Recovery Facilities (MRFs) where recyclable materials are removed using a semi-automated process, with residual waste transported to landfills in specially designed large-volume transfer trucks. There are five privately owned and operated MRFs in Orange County; these are located in the central, north, and north coast regions of the County. Privately owned MRFs are subject to the same stringent regulations that govern public facilities. There is no MRF located in the south region of the County. The residual waste is transported to lined landfills, where waste is deposited, compacted, and covered to minimize nuisance. There are three publicly owned and operated landfills in Orange County, located in the north, central, and south regions of the County. Landfills typically are constructed with a composite liner system, groundwater and landfill gas monitoring systems, and landfill gas collection systems, as specified by state and federal regulations. The collected landfill gas is either burned or converted into electricity for beneficial purposes.

To determine a letter grade, the Working Committee evaluated the solid waste collection, processing, and disposal systems. For each of these systems, infrastructure was evaluated in the categories of condition, capacity, and operations.

**Condition:** The collection system was evaluated for the age of vehicles, safety records and state of automation. The processing facilities were evaluated for the age of equipment, aesthetics, and safety records. The disposal facilities were evaluated for the age and condition of the heavy earth moving equipment, and aesthetics of the landfills.

**Capacity:** Capacity constitutes one of the key components of the infrastructure. Collected data was analyzed for present capacity and plans to meet the future growth. The collection system was evaluated by the number of collection vehicles in operation and their spare ratio. The processing facilities were evaluated for their permitted and available capacity. The disposal facilities were evaluated for their permitted and planned future capacity.
Operation: Several factors were analyzed in this category, however not all are listed. The collection system was evaluated for the number of programs offered. The processing facilities were evaluated for compliance with minimum standards, usage of odor control techniques, and waste processing efficiency. The disposal facilities were evaluated for compliance with minimum standards, rate of soil usage to cover refuse, and energy recovery efficiency.

System Statistics: Twenty-five waste hauling firms collect 85% of the waste generated in the 35 Orange County jurisdictions. Approximately 75% of Orange County waste is processed through five MRFs to remove recyclable materials. The other 25% of the waste is hauled directly to landfills without significant recyclable recovery. The County owns and operates three landfills that receive all in-County generated waste and some imported waste received from adjacent Counties. The County landfills receive approximately 18,000 tons of waste per day and have a permitted remaining capacity that will last through 2035. Long-term planning and preparation of an EIR are underway to increase the lifespan of the disposal system through 2048.

Collection, processing, and disposal systems were individually graded, then combined to develop a common grade for the entire solid waste system in Orange County. The final grade represents 25% weight for the collection system, 35% for the processing system, and 40% for the disposal system.

V. Data Gathering and Sources

To develop the grade for the solid waste management system, data was gathered from a variety of sources. The primary data gathering method was surveying the 11 major refuse haulers for collection information and five MRF operators for processing information. Survey questions were developed based upon key factors important to the infrastructure of the collection and processing components. Considerations included age and amount of equipment in the fleets, operating efficiencies, and the range of services provided. Regulatory agencies were also contacted. Follow-up calls were conducted to clarify any ambiguous answers. To evaluate the disposal component, which included the condition, the capacity, and operational efficiencies of the landfill system, information was gathered internally from landfill permits, planning studies, financial records, and inventory records. Survey results were compiled so that the Infrastructure Working Committee would have a basis from which to develop the report card grade.

VI. Results and Conclusions

The final grade of B represents a sound solid waste management system in Orange County. The system gets good grades for having the capacity, funding programs, and ability to meet the demands of present and future population growth. The system also received good grades for having a successful household hazardous waste separation program, and achieving nearly a 50% countywide diversion rate. While the system is strong, areas such as number of refuse collection vehicles and their automation, processing facilities capacity and efficiency, and landfill energy recovery programs are targeted for continuous development and expansion.
VII. References

The following resources were used to conduct the evaluation:

• Integrated Waste Management Department records for disposal system
• Questionnaire responses from haulers and MRF operators
• Regulatory Agencies:
  o California Regional Water Quality Control Board – Santa Ana Region
  o County of Orange Environmental Health Department
• Personal communications with haulers and MRF operators
  o Bob Coyle, Waste Management, Inc
  o Tom Vogt, Taormina Industries
  o Paul Relis, CR&R
• Discussion with industry experts
  o Jan Goss, County of Orange IWMD
  o Bryan Stirrat, BAS & Assoc
  o Sue Gordon, County of Orange IWMD
EVALUATION CRITERIA
ASCE SOLID WASTE REPORT CARD
(Updated 6/12/02)

COLLECTION

**Condition:**
1. Mandatory collection/coverage
2. Residential curbside recycling?
3. Average age of trucks

**Capacity:**
1. Adequate number of collection trucks
2. Spare ratio of active trucks to reserve trucks

**Operations:**
1. CHP safety inspections
2. Consistency across the County
3. Bulky items removal program

PROCESSING

**Condition:**
1. Aesthetics – clean, litter free? (Use LEA inspections)
2. Age of processing equipment
3. Separation of hazardous waste

**Capacity:**
1. Adequate permitted capacity
2. Are centers strategically located?

**Operation:**
1. Compliance with minimum standards (LEA inspections)
2. Odor control adequate (AQMD violations)
3. Safety Record (OSHA)
4. Processing efficiency (amt separated vs. amt brought in)

DISPOSAL

**Condition:**
1. Age of equipment
2. Aesthetics (use LEA inspections)
3. Energy Recovery – percentage of extracted LFG going to energy

**Capacity:**
1. Current capacity, both in years and in volume
2. Funding for capital projects for current and long-range capacity
3. Long term plans (20-50 years)

**Operations:**
1. Compliance with minimum standards (LEA inspections)
2. Funding for current ops needs and heavy equipment finance plans
3. Refuse to soil ratio
TRANSPORTATION

I. Introduction

The transportation infrastructure provides for the safe and efficient movement of people and goods. For all areas of development, a community is known and valued by its transportation system, either how bad or how effective it is. Orange County has achieved high standards for transportation system maintenance and improvements, but will require high levels of continued investment to maintain this standard.

II. Overall County Grade

Applying a weighting of 70 percent to Highways, 20 percent to Transit, and 10 percent to Bridges.

THE OVERALL COUNTY TRANSPORTATION GRADE IS C

III. Policy Options and Recommendations

During the latter part of the 20th century, Orange County’s transportation system had been neglected. Frustrated with a lack of transportation choices and efficient movement of peoples and goods, voters in November 1990 approved Measure M, the one-half cent sales tax for countywide transportation improvements. Measure M was expected to generate approximately $3.1 billion over the 20 year lifespan of the Measure to create a balanced multimodal transportation system and provide near-term relief on existing freeways, streets, and roads.

For the past ten years, the citizens of Orange County have seen vast improvements to their freeways as well as to their streets and roads. The Centerpiece of the Measure M program was the widening and reconstruction of Interstate 5 (I-5). Additional improvements were made to the Orange Freeway (SR-57), Riverside Freeway (SR-91), and the Costa Mesa Freeway (SR-55).

Additionally, the nation’s fastest growing commuter rail system, Metrolink, was created to serve over 6,000 riders per day on the Orange County line alone.

If the Orange County Report Card had been issued ten years ago, the overall County grade would undoubtedly have been a failing grade. Today, with over ten years of Measure M improvements, the condition, operation, and capacity of our transportation system has improved greatly and receives an overall grade of C.

There is still much work to be done, but most Orange County citizens have witnessed their Measure M dollars at work and are grateful.
IV. Infrastructure Assessment Methodology

The Transportation Infrastructure has three components that were evaluated in arriving at a combined grade: Highways, Transit, and Bridges. Within each component, there are categories of Condition, Operation, and Capacity, as appropriate.

In weighting each component, consideration was given to the relative person trips and corresponding vehicle miles traveled on each of the components. The highway system carries at a minimum over 90 percent of the person trips. However, the transit system provides critical mobility to a specific segment of the population. This consideration resulted in the assignment of 70 percent weighting to Highways, 20 percent to Transit, and 10 percent to Bridges. Within the Highway and Transit components, the Condition, Operation, and Capacity were weighted equally.

A. Highways

**Condition:** Within this general area of evaluation, freeways, highways, and local streets were rated based on their pavement condition and countywide programs in place that address pavement management. Orange County, through OCTA, initiated a Countywide Pavement Condition Assessment Study in 1998, which resulted in the development of an overall pavement condition rating system, convertible to a grading system, and initiation of an Arterial Highway Rehabilitation Program (AHRP). This study was based on data collected from 18 local agencies representing a reasonable cross section of Orange County communities. The AHRP provided a significant incentive (50 percent match) for local agencies to develop rehabilitation projects. Caltrans also maintains a pavement condition survey.

In addition, Measure M established a local maintenance of effort (MOE) that requires minimum expenditures for construction and maintenance programs. These funding and MOE programs improve the overall grade.

The grading considered the relative vehicle miles traveled on the freeways compared to County highways, which results in 50 percent weighting to freeways and County highways each. The grade for freeways is an A- and for County highways is a C+.

Combining these grades and raising the result a half grade in recognition of the comprehensive countywide AHRP results in an overall grade of B+.
**Operations:** Operations of the existing highway system were rated based on existing traffic demand relative to available capacity. OCTA completed in April 2002 a Strategic Plan for the Orange County Master Plan of Arterial Highways (MPAH), which included an assessment of the existing system to accommodate current demand. The evaluation criteria considered the volume to capacity ratio on each highway link. A volume to capacity (V/C) ratio is an expression of the traffic volume on a highway divided by its capacity. A ratio of 1.00 means the highway is at full capacity. The SR-91 to Riverside County is at full capacity, or a V/C ratio over 1.00, during peak hours. These ratios were then weighted to consider vehicle miles traveled and then summed countywide. The weighted V/C ratios were then converted to grades A through F.

In general, the urban highway system in Orange County is designed to perform at a V/C ratio of 0.90 and the freeways at a V/C ratio of 1.00 in the peak hours. Because that is the design criterion, the grading system reflects these V/C ratios as acceptable, or a grade of C.

The existing freeway, toll road, and HOV system received a V/C ratio of 1.07 and a letter grade of D. The arterial highway system calculated to a V/C ratio of 0.75 and a letter grade of B.

Combining these two and weighting by vehicle miles traveled yields a V/C ratio of 0.92 and a letter grade of C.

**Capacity:** Capacity of the future highway system considers future growth in population and employment and a committed highway system consistent with OCTA’s Draft Long-Range Transportation Plan. Only those projects programmed for funding within a seven to ten year time frame are assumed. This represents a conservative analysis approach and underscores the need for continued County resources similar to Measure M.

The evaluation criteria for the future highway system are consistent with that applied to the existing highway system.

The freeway, toll road, and HOV system received a V/C ratio of 1.31 and a letter grade of F minus. The arterial highway system calculated to a V/C ratio of 0.96 and a letter grade of C minus.

Combining these two and weighting by vehicle miles traveled yields a V/C ratio of 1.14 and a letter grade of F+.

Combining the three Highway categories of Condition, Operation, and Capacity yields an overall grade of C for Highways.
B. Transit

**Condition:** The overall condition of the Orange County transit system is based on a qualitative assessment of customer perception based on recent data collected by OCTA. In 2001, bus passengers completed a comprehensive survey of the Orange County bus system documented in the OCTA 2001 On-Board Survey. While customers gave the Orange County bus system high marks for the overall system, reliable equipment, and printed and on-line information resources, some customers identified room for improvement in the areas of frequency of bus service, phone information, and route information at bus stops. Given the room for improvement in customer needs, a grade of A- (numeric value of 90) was assigned to the condition of the Orange County transit system. Future on-board surveys will evaluate specific customer initiatives intended to improve this grade to an A or A+.

**Operations:** The evaluation of operations focused on measuring the efficiency of current operations. The specific efficiency measure, boardings per dollar of operating expense, indicates how much ridership is produced for each dollar invested in operating the bus system. To quantify Orange County’s standing for this measure compared to similar agencies in the United States, OCTA reviewed population, service area, and fleet size data from the nation’s transit agencies. This analysis led to the selection of Cleveland, Dallas, Minneapolis, Portland, San Diego, and San Jose as a reasonable peer group for comparison purposes. Based on a peer review of the six comparable transit agencies, OCTA received a near perfect grade of A+ (numeric value of 99) in this category. Consequently, OCTA is a top performer in providing efficient bus service to Orange County residents and workers.

**Capacity:** The evaluation of capacity focused on measuring the effectiveness of the current system relative to the County’s population. The specific effectiveness measure describes how many peak period buses are provided per 100,000 population. Based on a peer review of the six comparable transit agencies (Cleveland, Dallas, Minneapolis, Portland, San Diego, and San Jose), OCTA ranked near the bottom of the evaluation and receives a grade of F (numeric value of 34) in this category. Providing more frequent service and other service strategies would improve this grade in the future.

Combining the three Transit categories of Condition (90), Operation (99), and Capacity (34) yields an overall grade of C (74) for Transit.

C. Bridges

In California, the Department of Transportation (Caltrans) developed the California Bridge Health Index to judge the performance of its maintenance and rehabilitation efforts. The Index includes all structures that are assigned a bridge number (e.g., overcrossings, undercrossings, overpasses, pedestrian overcrossings) within the State of California. In Orange County, there are approximately 1,500 structures; two-thirds are on interstate or State highways, and one-third are on County highways or local streets.
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. The Health Index (HI) operates on the premise that each element on a bridge has an initial asset value when the element is in new condition. Over time, an element may deteriorate to a lower condition, resulting in a reduction in the asset value of the element. When maintenance or rehabilitation actions are performed, the condition of the element will likely improve, and the corresponding asset value of the element will be increased. At any point in time, the current element condition can be ascertained by field inspection or predicted for future years using a deterioration model. Once the condition is known, the current element value can be determined for all elements on the bridge. The HI for the bridge is the ratio of the current element value to the initial element value of all elements on the bridge.

In Orange County, the cumulative average of all the bridge health indexes results in a grade of B+.

V. Data Gathering and Sources

In developing the grade for transportation, the primary sources used were OCTA and Cal Trans District 12 resources. Additional sources were also met and are identified in the reference section.

VI. Results and Conclusion

To continue maintaining and improving the infrastructure, Orange County needs a continuous source of funding similar to Measure M. Without a continuing source of funds for transportation improvements, there will be a tremendous depreciation of transportation assets similar to pre–Measure M years. Additionally, there is a good chance that with increased population in Orange County, gridlock will set in on the roads, highways, bridges, and transit system.

VII. References

- Freeway and Arterial ADT Level of Service Analysis, August 2002, prepared by Ron Taira, OCTA.
- National Transit Database 2000.
- California Bridge Health Index, Caltrans, Enrique Alonso, District 12.
- Condition Assessment Report—Freight and Commuter Rail, June 2002, prepared by Michael McGinley, P.E., M. ASCE, Director of Engineering and Construction, SCCRRA.
URBAN RUNOFF / FLOOD CONTROL

I. Introduction

Orange County is being besieged by a serious problem that has managed to stay relatively unnoticed by the average person. Urban runoff, which is the contaminated, untreated water that flows year-round from our streets into the storm drain system and then directly into the ocean, is dramatically affecting the lives of Orange County’s residents and visitors.

Urban runoff typically contains pet waste, trash, pesticides, herbicides and fertilizers from over-watered lawns. These contaminants are carried directly to the ocean, through the storm drains, by the same water used when washing your car at home or hosing down your driveway. Anything that goes into the gutter goes directly into the ocean…without the benefit of treatment.

It is a fact that urban runoff carries bacteria and viruses to our ocean water. Recreating in these waters could result in serious illness to people who enter the water. Urban runoff can also contaminate our groundwater supplies by infiltration. A great deal of Orange County’s drinking water supply is taken from these groundwater basins.

Our beaches are an important hallmark in Orange County, a posting or closure can reduce the amount of money Orange County cities receive through tourism. Taxes are a large source of revenue for cities. Any reduction in a city’s revenue could mean higher taxes for residents, with a likely decrease in local services.

Flood control engineering also serves as a critical municipal function. Its purpose is to protect the public from the hazards of flooding. Improper engineering or the failure to maintain existing infrastructure can have catastrophic effects on the public, as well as public agencies. With safety as the primary goal, proper engineering and maintenance would greatly reduce the risk of losing property, homes and much-needed infrastructure.

The physical impact of floods on the public and property can be devastating. However, the financial consequences to the public may also be severe. Improper engineering and maintenance will likely result in an increased cost for flood insurance and could result in decreased property values. Life and property must be protected; allowing flood control infrastructure to degrade is not an option.

Clearly, drainage and flood control is something Orange County residents continue to take for granted. All of the local and regional drainage system jurisdictions must forge cooperative relationships in order to ensure those residents and businesses avoid the potential dangers of a flood.

Throughout history, the Santa Ana River has flooded the vast Northern Orange County floodplain, which is now home to more than two million people and to landmarks such as Disneyland and Knott’s Berry Farm. Consequently, flood protection has been an important safety and economic element for the community.
The U.S. Army Corps of Engineers is currently constructing the Santa Ana River Mainstem Project, which will provide Northern Orange County with a 190-year level of flood protection from the Santa Ana River. While the Santa Ana River Mainstem Project will provide a significant level of regional flood protection, the project will not provide flood protection from local storms. The Orange County Flood Control District must focus its future efforts on protecting residents from local storms.

Flood control channels, while important to protect the public from the risk of flood, have facilitated the movement of urban runoff as “contaminant superhighways.” Flood control planning must include water quality planning in the engineering, construction and maintenance processes if the problems associated with urban runoff are to be solved.

Flood control and urban runoff management (pollution control) are both vitally important to the health and economy of Orange County’s residents and visitors.

Urban runoff and flood control directly affect each resident of Orange County, ...no matter where one lives. If ignored and resources are not made available to engineer solutions through cooperative municipal efforts, we run the serious risk of adversely affecting Orange County’s quality of life.

II. Overall County Grade

**THE OVERALL COUNTY URBAN RUNOFF/FLOOD CONTROL GRADE IS  D**

Urban runoff infrastructure received a D-. Although a lot of discussion, studies, planning, and best management practices are currently occurring throughout the county, a great deal of coordination work needs to be done in order to come to grips with this problem, especially with public education. There is relatively little infrastructure in Orange County that addresses urban runoff pollution. Examples include one water quality treatment system in a tributary to Aliso Creek, several urban runoff diversion systems in Huntington Beach and Laguna Beach, and the San Joaquin Marsh, which provides significant treatment of dry weather flows within San Diego Creek.

Although flood control has a systematic approach to planning and construction that worked well in the past, nearly 50% of the flood control is deficient. Reexamination of the planning objectives on watershed-based level, incorporating water quality elements into design features and standards, needs to occur. Operations and maintenance need to be greatly enhanced to improve the water quality aspects of flood control infrastructure. Flood control as a component received a C grade.

III. Policy Options and Recommendations

**Urban Runoff**

• A multi-agency coordinated effort is needed, wherein all entities (publicly owned treatment works, water agencies, the county, cities, schools, railroads, Caltrans) agree to work cooperatively to fund and operate urban runoff infrastructure projects and public education programs to adequately address the significant problems caused by urban runoff.
• A reliable funding source needs to be established to construct, operate, and maintain urban runoff infrastructure. Currently, funds badly needed for improving flood control infrastructure are being diverted to fund compliance efforts with the municipal stormwater permits.

• Dry weather flow measurements are needed from major channels to better assess how much urban runoff is really being generated in Orange County.

• Flood control systems operation and maintenance practices need to be reevaluated in order to determine where and how much vegetation can be permitted to grow in basins and channels to provide water treatment, while still allowing for flood channel capacities not to be exceeded and result in flooding.

**Flood Control**

• The City Engineers Flood Control Advisory Committee (CEFCAC) should continue focusing in prioritizing flood control projects based on delivering cost effective flood protection improvements that benefit areas that are most vulnerable to flooding.

• In prioritizing flood control projects, the current evaluation process used by CEFCAC should be revised to give consideration to projects that also provide watershed benefits including water quality, and ecosystem restoration.

• The county and cities need to be encouraged to work together in developing flood control and water quality projects that complement each other.

**IV. Infrastructure Assessment Methodology**

**A. Urban Runoff Criteria**

**Condition:**

• Existing or near future condition of urban runoff water quality. What is the public health standard of the receiving waters? What is the effect on habitat from other constituents? What is the existing water quality of dry (non-storm) and wet (storm) weather runoff?

• Indicators to impairment of beneficial uses: bacteria, dissolved copper (toxicity), nitrate, 303(d) listing. Exceedances of regulatory standards (California Toxics Rule, REC-1, AB 411, 303(d) listing).
• Numbers of beach POSTINGS (not closures). How often do we exceed the regulatory standards?
  Considerations taken for projects funded or in design, capital improvement plans.
• Best Management Practices (BMP) planned or in-place. Existing or planned dry weather treatment devices,
  urban runoff diversions into wastewater treatment plants. Is there a comprehensive prioritization plan for
  diversions? New versus existing development. BMPs planned or implemented by various NPDES permit
  holders (Municipal Separate Storm Sewer (MS4), Industrial and Caltrans permits) Volume of dry weather
  runoff generated versus amount treated. How effective is the public education program?

Capacity:

• Efforts to improve water quality. Master Plans and Funding Plans Available. Sufficient capacity for dry
  weather flow, wet weather flow.
• How many watersheds with Master Plans in development? Future watershed planning by Army Corps of
  Engineers (ACOE).
• How much water quality monitoring data is being collected? Are citizen-based groups conducting monitoring?
• How much dry weather flow monitoring stations are there?

Operations:

• Compliance with regulatory requirements, eg. NPDES permits Grand Jury requirements. Compliance with
  basin plan objectives, REC-1, 2 standards, AB411 standards.
• Adequate responses to six Grand Jury reports?
• How are the infrastructure systems performing?
• Annual maintenance plans? What if any funding mechanisms are in place to fund O&M activities?

B. Flood Control Criteria

Flood control infrastructure within Orange County was divided into two components. The first component
consisted of approximately 300 miles of channels that are owned and maintained by the Orange County Flood
Control District (OCFCD). The second component included all facilities owned and maintained by other
jurisdictions, city, etc (approximately 330 miles). The Flood Control Infrastructure Assessment Study
encompassed both components to generate a comprehensive countywide deficiency report.
The Orange County Flood Control District, which was created on March 23, 1927 by the California State Legislature, is a subdivision of the state government and has the power to deal with flood control and water conservation problems in Orange County. The OCFCD can levy taxes and issue bonds for flood control facilities. The City Engineers Flood Control Advisory Committee (CEFCAC) was formed in August 1966 to help prioritize regional flood control projects for inclusion in the OCFCD’s Seven-Year Capital Improvement Plan. The committee is composed of a City Engineer from each of the five Supervisorial Districts. Appointments to the CEFCAC are made by the City Engineers Orange County Division, League of California Cities. In addition to the City Engineers, there is an OCFCD representative to CEFCAC designated by the Director, County of Orange Public Facilities and Resources Department (PFRD). Nominations received from cities, PFRD divisions and communities are analyzed by PFRD’s Flood Program Division staff and presented to CEFCAC for its consideration.

The criteria used to evaluate flood control infrastructure include the following:

**Condition:** The following pertaining to the condition and operation of the countywide flood control channel system was used:

- What portions are open channels vs. underground?
- How many miles of channel system does the OCFCD operate and maintain?
- What is each channel’s design: concrete lined, rock riprap lined or earthen, is it a natural watercourse?
- What is the relative condition of each watershed from an O&M perspective?
- What would be the approximate cost required to achieve optimal condition?

**Capacity:**

- Hydraulically inadequate by OCFCD hydrology and design standards.
- Based on latest bid abstract compiled from the list of the most recently built OCFCD flood control construction project, and over a billion dollars needed to achieve 100-Year capacity of all current OCFCD facilities.

**Operation:**

- What types of maintenance activities are accomplished by PFRD/O&M?
- How are deficiencies discovered?
- How are repairs prioritized and scheduled?
- How effective is our maintenance of channels?
- Is O&M able to achieve annual channel cleaning as needed?
- Is O&M able to cover all costs for cleaning and repairing channels?
- What impact is the regulatory permit process having upon our routine O&M program?
V. Data Gathering and Sources

Urban Runoff

Orange County Grand Jury Reports dealing with urban runoff, beach closures, and beach water quality testing were reviewed, as well as were the various agency responses to these reports. Information was gathered from the website www.ocwatersheds.com. A review of the report, “Laguna Beach Diversion,” published by Lisa Penna and Derek Weiske in the ASCE publication, Civil Engineering, was reviewed. Tom Meregillano of the Orange County Sanitation District provided the following information: current and future planned urban runoff diversion projects in north and south county; data collected from OCSD and SOCWA; current and projected volumes of urban runoff being treated by POTWs in north and south county; data collected from OCSD and SOCWA; current and future roles of POTWs in north and south county in managing urban runoff in conjunction with other stakeholders within the Orange County watersheds.

Rick Wilson of Surfrider summarized the conclusions of the Southern California Coastal Water Research Project’s Mass Emissions Report as they relate to stormwater discharges, investigated the sources of the Grand Jury Report’s 100 MGD flow estimate, and estimated county dry weather flow based on measured flow per acre in different watersheds.

Bruce Moore of the County of Orange provided a database on water quality. Citizen-based monitoring information was gathered by Randy Seton, a member of Orange County CoastKeeper. Mike Balsamo and Lisa Penna reviewed the annual MS4 NPDES reports by the County of Orange and reported on NPDES compliance efforts by the cities. Eric Strecker provided information on the Irvine Ranch Water District’s Master Plan for Natural Treatment Systems in the San Diego Creek Watershed and also provided insight as to how Orange County compares with other regions in the United States in regard to urban runoff pollution control. Larry Honeybourne provided beach water quality data and other information related to activities by the Health Care Agency.

Flood Control

The Flood Control Working Group collected data from existing county data sources and by telephone from various cities. Questions were asked regarding overall city budgets and budgets for drainage and NPDES projects.
VI. Results and Conclusions

Urban Runoff

Infrastructure to address urban runoff pollution is merely in its infancy in Orange County. Flood control infrastructure planning needs to create a new vision, which allows it to adequately protect the public from the threat of a flood while also protecting the public from the negative effects of urban runoff.

The public is unaware that urban runoff includes both year-round dry weather runoff as well as stormwater runoff from rainfall events and that it can be contaminated with a large mixture of pollutants. Dry weather urban runoff results when we overwater our lawns, wash our cars at home and wash down our driveways. This water then carries pet waste, litter, pesticides, nutrients and an array of other harmful pollutants to gutters and storm drains. Stormwater runoff can contain high levels of sediments, toxic heavy metals, oil and grease, and other harmful pollutants.

Currently, there are seven publicly owned treatment works (POTWs) that are taking the dry weather urban runoff from 31 diversion projects throughout Orange County. There is only one operating urban runoff water quality treatment system in Orange County; the City of Laguna Niguel is operating it. The County of Orange plans to install another urban runoff treatment plant by the end of 2002. Other projects to divert urban runoff to POTWs, or treat urban runoff via a mechanical treatment system or constructed wetlands, are in the planning stages.

The responsibility for reducing the urban runoff problem falls on the shoulders of many different parties. It is a multi-jurisdictional responsibility that requires multi-party cooperation. Certainly, individual behavior must be changed. While the process of educating the public continues, we must incorporate sound planning methods that help us accomplish our goal. Coordination among the separate entities holding different types of NPDES permits: the Municipal Separate Storm Sewer System, the CALTRANS permit (regulates stormwater runoff from freeway and highways owned or operated by Caltrans), the General Industrial NPDES permits (e.g. landfills and other industrial activities) and the General Construction Activity Storm Water Permits (construction over five acres or more) must occur. The Regional Water Quality Control Boards must take the lead in this change.

The apparent link between beach postings and urban runoff came to the forefront after the Huntington Beach closures in the summer of 1999. Since that time, numerous studies and projects have been developed by a variety of agencies to establish, or confirm, a clearer linkage between urban runoff and beach postings. A definitive cause (the sources of bacteria) or solution has not yet been found.
Flood Control

Flood control infrastructure requires additional funding to make capital improvements still needed and to continue the maintenance of those that have been built. Most of Orange County depends upon the regional flood control infrastructure to provide flood protection. Consequently, this system must be safeguarded in order to protect our county residents and businesses from being flooded. Local drainage efforts must be improved, especially in the area of operations and maintenance (e.g. cleaning out of flood control channels by cities).

Ironically, the infrastructure which has effectively addressed flooding problems could exacerbate. This occurs when areas where rainwater and other runoff could infiltrate into the ground and wetlands are eliminated, thereby not providing natural filtering of surface water flow. The flood control system unwittingly has served as “contaminant superhighways” rapidly transporting a variety of pollutants generated by our urban society to the ocean.
VII. References

• California Regional Water Quality Control Board, San Diego Region, Order No. R9-2002-0001, NPDES No. CAS0108740, Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) draining the watersheds of the County of Orange, the incorporated Cities of the Orange County, and the Orange County Flood Control District within the San Diego Region.

• California Regional Water Quality Control Board, Santa Ana Region, Order No. R8-2002-0010, NPDES No. CAS618030, Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and County of Orange, the incorporated Cities of the Orange County within the Santa Ana Region Area-wide Urban Storm Water Runoff Orange County.

• 2001 NPDES annual report in compliance with the Santa Ana and San Diego MS4 NPDES permits CAS0108740 and CAS618030.

• Civil Engineering, February 2002, Volume 72, Number 7, “Storm-Water Strategy”, Derek Wieske, P.E., Lisa M. Penna, P.E., American Society of Civil Engineers.

• Orange County Grand Jury Report, June 15, 1999-Coastal Water Quality and Urban Runoff in Orange County.

• Orange County Grand Jury Report, May 15, 2000- West County Coastal Watershed Coordinating Committee.

• Orange County Grand Jury Report, May 17, 2000-The Rainy Season’s “First Flush” hits the Harbors of Orange County.

• Orange County Grand Jury Report, June 20, 2000-“Testing the Waters”: The Orange County Health Care Agency

• Orange County Grand Jury Report, June 20, 2001- The Urban Runoff Battle, Ready, Fire, Aim!

• Orange County Grand Jury Report, April 25, 2001-Sewage Spills, Beach Closures, Trouble in Paradise?

• 2001 Annual Ocean and Bay Water Quality Report, May 2002, County of Orange Health Care Agency, Environmental Health (available @ www.ochealthinfo.com/regulatory/ocean/index.htm)

• Urban Runoff, Orange County Sanitation Districts, SCAP

• Water Quality Data from Environmental Resources, County of Orange.

• www.ocwatersheds.com
I. Introduction

The safe and reliable collection, treatment and disposal of wastewater and its residuals are essential elements of our ongoing commitment to protect public health and the environment in Orange County. The measure of how we fund, operate and maintain this vital part of our public infrastructure will determine the depth of our future commitment to improving the quality of life that we have come to enjoy in our communities. By encouraging improved stewardship and leading by example, we can ensure that future generations will reap the benefits of our work.

This initial effort utilizing the national ACSE Report Card model and adapting it on a local level is innovative and challenging. This work effort is the product of many industry professionals, both public and private. Responses to our survey questions were provided by 42 of the 44 cities and agencies invited. This excellent response rate is indicative of the interest in this important effort. This work effort is the product of many industry professionals, both public and private.

This is only a first step. Engaging the many shareholders we mutually serve is the next step in gaining support for improving desired levels of service and system performance, including securing the needed funding.

II. Overall Countywide Grade

The overall grade for the wastewater systems in Orange County was reached by independently evaluating the two key components of the wastewater system: the collection systems and the treatment plant systems. The scores were then combined to arrive at an overall countywide, system-wide grade.

The summary grade for all collection systems is a C-. The summary grade for all treatment plants is a B+. This gives us a combined score for treatment plants and collection systems of a C+. This generally shows that there are larger deficiencies in the wastewater collection systems compared to the treatment plants.

The overall county grade is a C+.

III. Policy Options and Recommendations

A well operating wastewater collection and treatment system is essential to the quality of life and economic vitality of Orange County. The evaluations of the wastewater systems in Orange County demonstrate that to achieve this objective, several Policy Options need to be considered:
1. There must be sufficient revenues dedicated to wastewater treatment facilities and collection systems.

   Development of Dedicated Wastewater Infrastructure Funding: Having a safe and reliable wastewater system that meets or exceeds all pertinent state and federal standards is the goal of every city and local jurisdiction that owns or maintains its own wastewater system. To effectively implement this goal, there needs to be a sufficient and consistent source of funds that ensures adequacy for continuous operation, maintenance and rehabilitation of needed facilities. Thus, all agencies that are responsible for collecting or treating wastewater should develop funding mechanisms dedicated to the development and maintenance of a wastewater system that meets the level of ongoing service needed by the community. Dedicated funding is critical so that those departments responsible for wastewater do not have to compete unequally for general funds with other departments (like fire, police, and parks).

2. There must be adequate regulatory guidelines and oversight to ensure the safe, reliable, and continuous operation of wastewater facilities.

   Encourage San Diego RWQCB to update its Waste Discharge Requirement Regulations: The consistently higher grades achieved by the wastewater treatment facilities are partly due to the fact that they are required to operate under EPA National Pollutant Discharge Elimination System (NPDES) permits. This regulatory requirement has focused attention on the treatment plant facilities and necessitated major upgrades and overhauls for these facilities. Wastewater collection systems have not been historically permitted in a similar fashion.

   The newly introduced Waste Discharge Requirements (WDR) Order R8-2002-0014 by the Santa Ana Regional Water Quality Control Board (RWQCB) is designed to improve the conditions, capacity and operations of the sewage collection systems. The focus is reduced sewer spills and reduction of the impacts of fats, oils and grease, and minimizing impacts to storm drains and surface waters through improved asset management strategies. This Order, adopted on April 26, 2002, affects most but not all of the Orange County collection systems. South Orange County collection systems are not in the Santa Ana Board’s jurisdiction and are covered by the San Diego RWQCB Order 96-04 which focuses on sewage spill prevention and spill reporting. It is recommended that the San Diego RWQCB update its waste discharge requirements to ensure that they are more in line with the provisions of the Santa Ana RWQCB WDR Order.

3. Since the combined C+ wastewater grade is an overall grade for all wastewater facilities within the county, it is strongly recommend that each individual agency communicate to its constituency how its system compares to the countywide grade.

4. Cities should consider forming “Citizen Infrastructure Advisory Committees” to assist city governments in developing policies and to maintain continued focus and attention on prioritizing infrastructure needs, levels of service, and allocation of funding. The cities of Fullerton and Huntington Beach have already begun such efforts.
5. As financing and funding become more challenging in the future, there should be discussions within Orange County for innovative regional approaches to wastewater collection and treatment operations. Benefits include improved economies of scale, sharing the most advanced technologies and leveraging expertise.

IV. Infrastructure Assessment Methodology

The evaluation of the wastewater system was divided into two technically logical components: collection systems and treatment facilities.

Each of these two component categories was independently evaluated for condition, capacity, and operations and then combined for a final grade. Surveys were sent to all cities and wastewater agencies in Orange County specific to each category component. Surveys were opinion based. A series of statements were developed for each element so that a competent respondent with average to good awareness of their systems and issues could respond easily. Responses were received from almost all surveys sent. Other data collected and taken into consideration in the overall evaluation were: total length of pipe; pipe sizes; number of manholes; number of pump stations; number of laterals; current and projected population; total number of staff; total number of hot spots; total number of sewage spills; treatment facility design capacity, and the average flow rate through the treatment facility during fiscal year 2001-2002. For example, a sewer system with only one or two pump stations was judged only by its gravity system performance, since their pumping systems were not a major component of its overall operation. One very small agency has only two pump stations to pump all of its flow out of its system; this was deemed critical and the data were used.

For each facility category, a description of key areas was identified and a basis for grading and evaluation developed. The following is a summary of these sub-categories for the two major wastewater categories.

1) Wastewater Collection Systems

Condition: This included known structural conditions of the gravity pipes and pumping station force mains based on closed circuit television (CCTV) observations; condition of pump station force mains based on maintenance history and age; how grease and roots affect the pipes; manhole conditions including structural problems and rehabilitation needs; and pump station structures, equipment and rehabilitation needs.

Capacity: This looked at the gravity pipes, pump stations, and auxiliary facilities, such as emergency generators and critical pump station parts and components, and their performance in daily dry-weather and seasonal wet-weather conditions and power outages.

Operations: This considered staff or contractor resources and their knowledge and certifications, and whether a documented preventative maintenance program was in place. We also looked at mobile equipment, tools and spare parts. Access to facilities to adequately perform services was included. Data sources such as sewer maps, O&M manuals, standard operating procedures (including if GIS was being used) were surveyed. Questions about cleaning and inspection frequencies included hot spots and system-wide routine cleaning, CCTV pipe inspection and a visual manhole inspection program.
2) Wastewater Treatment Facility Systems

**Condition:** This included structural, facility, land outfall (including valves and air vacuums), ocean outfall (including valves and air vacuums), facility/operating equipment instrumentation and electrical systems, and occupied buildings.

**Capacity of Regional and Local Facilities:** This concerned local and regional facility design capacity (for peak dry and wet-weather flows as well as recycled water production demands); land outfall capacity (for peak dry and wet-weather flows); and ocean outfall capacity (for peak dry and wet-weather flows); and solids handling.

**Operations:** This evaluated auxiliary facilities (backup power, flow management, alarms and communications, etc.); level of critical equipment redundancy; performance (ability to meet permitted effluent discharge requirements; air quality requirements, operational and maintenance goals, etc.); and staffing levels.

V. Data Gathering and Sources

No reference or sample forms were available from the ASCE national effort for our use in gathering the information for the Orange County effort. After meeting and conferring, the Infrastructure Working Committee made some reasonable assumptions about the data collection process. This resulted in the development of opinion-based survey forms for obtaining detailed response statements about the general conditions, capacity, and operations of Orange County’s wastewater collection systems and treatment facilities.

These draft forms were discussed, reviewed and finalized by focus groups of local plant and collection system operators. The goal was to produce survey forms that were easy to understand, quick to fill out, with the hope of maximizing the participation of the identified agencies. Rating categories for the collection systems were “Excellent; Good; Fair; Poor; or Don’t Know”. Variations of these categories were used for the treatment facilities survey. The final surveys were e-mailed to the respective agencies for completion. Many of the forms were completed and returned very quickly. The responses to each question were then entered in a computer-based spreadsheet developed by one of the Infrastructure Working Committee members for compilation and evaluation. A “Don’t Know” response was counted as a “poor,” although there were very few such responses. These opinion-based ratings were assigned numeric scores for compilation. Data was catalogued by agency name. A quality control check was done to ensure that all data was entered into the database correctly.

Military establishments, private systems owned by homeowner associations, State of California owned-systems and private business complexes were not included. The County of Orange is responsible for the operation of several small wastewater systems in the following areas: two boat septage pumping facilities operated by the Harbor Patrol at County-owned harbors, 19 other pump-out facilities that are privately operated on County-leased land; the collection systems, portable toilets, sewage dumping stations and septic tanks at County parks; the collection systems and pumping facilities at County beaches; and the collection systems at John Wayne Airport and other County-owned facilities. None of these small systems were included.
VI. Results and Conclusions

The survey forms were returned by July 30, 2002. The Infrastructure Working Committee was very pleased with the degree of participation in the data gathering effort. 35 of 37 collection system cities/agencies and 8 of 8 plant facilities in the County of Orange responded to the survey, and their replies were incorporated into the findings.

Results of Data Gathering and Evaluations and Overall Findings:

<table>
<thead>
<tr>
<th>Wastewater Collection System</th>
<th>Wastewater Treatment Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition</td>
<td>D+</td>
</tr>
<tr>
<td>Capacity</td>
<td>B</td>
</tr>
<tr>
<td>Operations</td>
<td>C+</td>
</tr>
<tr>
<td>OVERALL GRADE</td>
<td>C-</td>
</tr>
</tbody>
</table>

| Condition                   | B                             |
| Capacity                    | A                             |
| Operations                  | B                             |
| OVERALL GRADE               | B+                             |

Several interesting findings were highlighted by these grades.

Throughout the county, there is a wide range of differences in wastewater collection systems:

1. Organizational governance: (22 municipally-owned systems and 15 special districts)
2. Size of agency: (Sunset Beach Sanitary District serves only 4,000 people, while the City of Santa Ana serves over 350,000).
3. Age of system: (older cities like Anaheim began developing wastewater infrastructure around the turn of the century [1900s] while new South County areas like Rancho SantaMargarita’s systems were first constructed in the early 1970s).

Here are some notable trends:

1. The overriding criterion that appears to determine whether a system is well maintained and operated (and thus achieved higher grades) is the existence of dedicated sewer fees. Special districts, whose revenues are dedicated to the single purpose of maintaining the sewer collection system, and municipalities with dedicated sewer fees generally received better grades than municipalities whose wastewater departments had to compete with police, fire, and parks for general fund revenues.

2. By far, the most stressed wastewater infrastructure element is the sewer pipe collection system. The ratings for collection systems were weighted as follows: Condition = 40%; Capacity = 30%; Operations = 30%. Many sewer systems in Orange County, particularly in older cities, have reached their design life before they are replaced. As the condition of older sewers deteriorates, they are more prone to root intrusion, offset joints, debris and grease build-up, and site-specific failure. Thus, Condition was weighted more heavily than Capacity and Operations.
3. Wastewater treatment facilities as a whole received better grades than collection systems. Several factors accounted for this:

a. Almost all wastewater treatment facilities are owned and operated by special districts that have a single purpose and dedicated funding for planning, design, construction, and operation and maintenance.

b. Treatment facilities have historically received greater attention than collection systems, as they are operated under NPDES permits. These regulatory rules require treatment plants to meet certain effluent discharge levels and operating criteria; thus constant attention is given to meeting receiving water quality standards.

c. Collection systems have not been permitted in a similar fashion, but this is changing as a result of the recent RWQCB WDR affecting most of Orange County.

d. Also considered in the final grade was the fact that Orange County Sanitation District’s Board of Directors recently voted to upgrade treatment to full secondary equivalency after operating since 1982 under Section 301(h) permit based on the 1977 amendments to the Clean Water Act. This decision (including a recent RWQCB order to disinfect treated effluent) will require a considerable infrastructure investment and an increase in service fees for the foreseeable future.

However, it should be noted that, unlike collections systems, which comprise 37 reasonably well distributed cities and agencies, in the treatment plant systems category, a single organization (Orange County Sanitation District) treats nearly 80% of all wastewater flows in the county. Because these grades were proportionately weighted based on an average treated flow rate, this large regional well-funded and well-run agency tends to disproportionately skew the grades for treatment systems.

After careful and deliberate discussions about the assignment of a final overall grade for all of the county’s wastewater infrastructure, the Infrastructure Working Committee settled on an approach that was felt to be reasonable and defendable based on giving the each of the eight treatment plant facilities individually equal importance as any one collection system.
VII. References

• ASCE National Report Card for Wastewater weblink:
  http://www.asce.org/reportcard/

• New Hampshire Report Card for Wastewater weblink:

• Regional Board WDR and M&R requirements dated April 26, 2002 weblink:
  http://www.swrcb.ca.gov/rwqcb8/

• Sample survey forms and grading criteria for collection systems and treatment plants weblink:
  http://ocreportcard.eng.uci.edu/

• WEF Manual of Practice (MOP) 7 for collection systems management:
  http://www.wef.org/

• WEF Manual of Practice (MOP) for treatment plants: http://www.wef.org/

• EPA NPDES Program for Waste Water Treatment Plants (WWTPs):
  http://cfpub.epa.gov/npdes/npdesreg.cfm?program_id=1

• Proposed EPA SSO Rule (cMOM) January 4, 2001 weblink:
  http://cfpub.epa.gov/npdes/ssorule.cfm

• GASB Statement 34 weblink: http://www.gasb.org/reptmodel/

• CWEA Collection System Technical Certification Program and study guides:

• State of California Certification Program for WWTP Operators:
  http://www.swrcb.ca.gov/cwphome/opcert/

• CSU Sacramento Collection System and Treatment Plant study guides weblink:
  http://www.owp.csus.edu/OWPHome.html
I. Introduction

Water is the life-blood of Orange County’s remarkable economy and lifestyle. The combination of a large groundwater basin and Santa Ana River, and two major sources of imported water provided a solid foundation for the County’s steady growth over the last five decades.

The County has two major water use areas. Those who live over the large groundwater basin in north and central Orange County depend on a combination of locally pumped groundwater and imported water from the Colorado River and northern California. Those in the southern portion of Orange County depend almost entirely on imported water. Our evaluation included a combination of 21 local cities and water districts, the groundwater basin management agency Orange County Water District, and the regional water importers Municipal Water District of Orange County and Metropolitan Water District.

Orange County is in the midst of significant investments for water supply and infrastructure. There are nearly 7500 miles of water main and 300 potable water storage tanks in Orange County. The population of 2.9 million uses about 700,000 acre-feet or 228 billion gallons of water annually. Infrastructure projects include replacement or rehabilitation of older distribution pipes; seismic upgrade, refurbishment or outright replacement of storage tanks; replacement of older shallow wells; installation of backup power at key facilities; improvements to computerized control systems (known as SCADA – Supervisory Control and Data Acquisition). Most water agencies expect to spend money on security enhancements as well. New water supply won’t come from a single source or a new aqueduct to a remote location, but rather a portfolio of different sources including groundwater banking and conjunctive use, water transfers, ocean desalting, water recycling, and increased efficiency. Successful implementation of all of these efforts can create a sustainable future for Orange County.

Water quality continues to be a top concern and priority. Both imported and local groundwater sources are subject to risk from chemicals and residues from past or present agricultural and industrial activities. The Colorado River is threatened by perchlorate contamination in Nevada. The State Water Project has higher levels of organic precursors that can react with disinfectants to form harmful byproducts. Portions of the groundwater basin have experienced contamination from such chemicals as MTBE, 1-4 Dioxane, Perchlorate, and VOC’s (volatile organic carbon). Despite these challenges, water agencies have continued to serve water that is in full compliance with State and Federal water quality regulations. However, there is a climate of increased risk as new contaminants are identified and regulated.
II. Overall County Grade

Water infrastructure in Orange County received a grade of B. By and large the infrastructure is in good or excellent condition, but there are isolated areas of older facilities which will require investments to repair or replace in a timely manner.

This grade reflects well on past investments to develop and maintain our water infrastructure, but is also considered to be a precarious B due to several areas of risk that will have to be dealt with in the coming few years. These risk areas are highlighted later in this report.

<table>
<thead>
<tr>
<th>Report Card Grade Summary</th>
<th>Score</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade for Condition:</td>
<td>80%</td>
<td>B-</td>
</tr>
<tr>
<td>Grade for Capacity:</td>
<td>91%</td>
<td>A-</td>
</tr>
<tr>
<td>Grade for Operations:</td>
<td>83%</td>
<td>B</td>
</tr>
<tr>
<td><strong>Overall Orange County Water Grade:</strong></td>
<td><strong>85%</strong></td>
<td><strong>B</strong></td>
</tr>
</tbody>
</table>

III. Policy Options and Recommendations

Based on our evaluation, the following policy options and recommendations apply within Orange County. Orange County needs to focus on several risk areas to prevent any slippage (and associated deterioration of quality and water service reliability) which include:

- **Aging infrastructure:** While some small areas of the County have sections of pipe in the ground that are 80 or even 100 years old, much of the water infrastructure in the County was built within the last 40 years. Over the next 5 to 10 years it will continue to age and begin to fail at an increasing rate. Water retailers will need to replace, reline or repair older steel and iron pipe as it corrodes over time. As a policy, water agencies should formally address proactive maintenance and repairs, both in their annual budgeting and through a well developed and comprehensive maintenance management program. The groundwater basin will need to invest in newer seawater barrier facilities, and spreading basins. Water tanks will need more frequent inspection and monitoring for corrosion damage. Many agencies do not routinely assess the extent of corrosion of their critical facilities. Others have not installed equipment to reduce or eliminate corrosion. Corrosion problems have recently contributed to serious failures of water facilities.

- **Water Supply:** Both our local groundwater and more distant imported water supplies are under threat from contamination, environmental cutbacks, and water rights reallocations. In particular today, the supply of Colorado River water to Southern California is a concern. California may be cut back from surplus Colorado River water it has enjoyed. While the cut is projected to occur gradually over the next 15 years, there are risks that it could come all at once as early as 2003. New supplies are needed to offset potential losses of imported water and to accommodate expected growth in California over the next 20 years. Water recycling, ocean water desalination and water use efficiency were noted as potential ways to solve this problem. It is projected that Orange County may need to spend up to $800 million over the next five years on a combination of local and regional water supply projects.
• Water Quality: We enjoy some of the safest drinking water on the globe. Our grade reflects a high standard of service among the water retailers in the County. However, nearly everyone interviewed expressed concern over the possibility of contamination of our imported or local water sources. Groundwater managers need to pursue ever more vigilant source control to prevent or quickly detect contamination. Metropolitan needs to continue to seek water quality improvements in the CalFed process and pursue a rapid cleanup of the perchlorate spill impacting the Colorado River in Nevada. As new contaminants are studied, measured and regulated, the cost to provide safe water will continue to increase. Regulations should be set in a manner that derives the most public health benefit for the costs involved.

• Water Use Efficiency: The good news is that Orange County has one of the best track records in water use efficiency. However, only half of the agencies surveyed have signed the statewide memorandum of understanding for water use efficiency best management practices (BMP’s). Many agencies are complying with many of the BMP’s. Often this compliance comes through regional programs implemented by Metropolitan or MWDOC. These BMP’s will be mandated in the near future. Funding for regional programs is limited, and therefore not all BMP’s can be pursued diligently. Key areas to focus on are landscape irrigation efficiency and water rates that encourage efficient water use. More efficient landscape irrigation not only extends our water supplies, but also has been shown to significantly reduce harmful urban runoff. The County, water agencies, and local Cities should join forces to put new water efficient landscape irrigation practices at the top of the funding priority list.

• System Reliability: Portions of South Orange County depend heavily on imported water that is delivered through two major pipelines and one regional filtration plant. A study is underway through the Bureau of Reclamation and the Municipal Water District of Orange County in conjunction with local retail agencies in South County to determine options for improving system reliability. Options include additional local and regional water storage in South County, additional local interconnections and looping major feeder lines, a seawater desalter project, a large filtration plant and tunnel project by Metropolitan, and others. These reliability projects should be implemented in a timely manner.

• Seismic Retrofit: While most facilities complied with seismic codes when they were constructed, few agencies have conducted comprehensive seismic surveys to determine if these facilities meet today’s standards. Many facilities have not been updated to current code requirements. Water supply is a critical lifeline facility during a major earthquake, so the integrity of these systems must be protected from failure in seismic events.

IV. Infrastructure Assessment Methodology

We believed it was important to focus on the three primary aspects of water management – local retail service providers, imported water service, and the large groundwater basin that serves much of north and central Orange County. We developed a methodology that addressed the general categories of Condition, Capacity, and Operations. In addition, we developed 10 subcategories for review. Each subcategory was weighted with 10 points for a total of 100 points. The criteria are shown in the reference section.
For Condition, we examined local, imported, and groundwater facilities. For Capacity, we considered availability of adequate supply, looked at the reliability of delivery systems, evaluated the capacity of local facilities, and reviewed the capacity of regional facilities. For Operations, we reviewed the ability of local and regional agencies to meet applicable water quality regulations; evaluated maintenance, repair and replacement funding levels; and checked implementation levels for water use efficiency best management practices (BMP’s).

Our intention was to develop a grade for the County as a whole, since responsibility for water infrastructure is shared at the local, basin and import level. We compiled the responses into a countywide grade by subcategory.

V. Data Gathering and Sources

We gathered data for this report card using a survey/interview format. For each of the 10 subcategories discussed above, we developed a series of questions. We arranged individual meetings with the manager or operator of 21 water systems in the County. We sent copies of the report card criteria and the survey/interview questions ahead of our meeting date to allow the respondent time to research answers. In most cases, the respondents had prepared their answers ahead, or were ready with clarifying questions.

Some of the questions called for objective data or status responses (Does your agency serve water that complies with drinking water regulations? Have you conducted a seismic assessment of your critical facilities?). Some called for subjective answers (Rate the condition of your system as excellent, good, average, fair or poor. Do you think Orange County has an adequate supply of water for the next 20 years?).

Four members of the Infrastructure Working Group conducted the interviews. Each member interviewed between two and eight agencies. Those responding accounted for more than 88% of the population and 86% of the retail water demand in the County.

Information developed for this infrastructure report card section on water systems was provided through a survey/interview format with 24 water agencies. Interviewees were asked to cite reference material and in many cases this was noted. In general, the reference materials most frequently used were the annual budget, capital improvement program, water master plan, and urban water management plan for the agencies. In some cases, an agency referenced a specific evaluation or study (such as for corrosion, seismic, or instrumentation/control).

VI. Results and Conclusions

<table>
<thead>
<tr>
<th>Report Card Grade by Category</th>
<th>Score</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – Condition/Local</td>
<td>8.0</td>
<td>B-</td>
</tr>
<tr>
<td>2 – Condition/Import</td>
<td>8.1</td>
<td>B-</td>
</tr>
<tr>
<td>3 – Condition/Basin</td>
<td>7.8</td>
<td>C+</td>
</tr>
<tr>
<td>4 – Capacity/Supply</td>
<td>7.8</td>
<td>C+</td>
</tr>
<tr>
<td>5 – Capacity/Reliability Local</td>
<td>9.9</td>
<td>A</td>
</tr>
<tr>
<td>6 – Capacity/Local</td>
<td>9.7</td>
<td>A</td>
</tr>
<tr>
<td>7 – Capacity/Regional</td>
<td>9.0</td>
<td>A-</td>
</tr>
<tr>
<td>8 – Operations/Water Quality</td>
<td>8.2</td>
<td>B-</td>
</tr>
<tr>
<td>9 – Operations/Maintenance, R&amp;R</td>
<td>9.1</td>
<td>A-</td>
</tr>
<tr>
<td>10 - Operations/Efficiency, BMP’s</td>
<td>7.4</td>
<td>C</td>
</tr>
</tbody>
</table>
Category 1 - Condition/Local

Local water facilities were generally in good condition. Some agencies reported concerns over the condition of older piping and/or water storage tanks. Many of these were either recently addressed, or planned for repair or replacement within the next 3 to 5 years. Corrosion protection and seismic integrity were questions for some systems.

Category 2 – Condition/Import

Imported water facilities serving the county consist of a large filtration plant, and several large feeder pipelines extending across northern Orange County or into southern Orange County. One of the major pre-stressed concrete pipelines experienced a surge-related failure in 1999. Testing using new state-of-the-art methods revealed more problem areas that are now being addressed by Metropolitan in several phases of repairs. Other import facilities of this type will need to be monitored for premature failure. Some of the other major feeder pipelines are 40+ years old and are entering a period of higher maintenance needs due to corrosion effects.

Category 3 – Condition/Basin

Many survey respondents expressed concerns about the condition of the groundwater basin. It was generally acknowledged that the Orange County Water District would need to make significant investments in the seawater barrier, and groundwater recharge facilities. Concerns were raised over lower water levels in the basin in recent years. Most retail agencies plan to replace older wells over time.

Category 4 - Capacity/Supply

There were mixed views on whether Orange County has an adequate supply of water for the next 20 years. Concerns were expressed over the loss of Colorado River supplies, potential seawater intrusion in the Orange County groundwater basin; declining basin levels; and loss of supplies due to groundwater contamination. Projects to address these risks included completion of necessary agreements by Metropolitan on the Colorado River, seawater barrier enhancements by OCWD, the Groundwater Replenishment System by OCWD, source control and cleanup projects and implementation of new supply projects such as groundwater banking, ocean water desalination, recycling, and water use efficiency.

Category 5 - Capacity/Reliability Local

Local water systems scored well in their reliability. One area of concern is the ability to withstand an outage of imported water. Most agencies indicated they could provide service for at least seven days during an unplanned outage (even in summer). Others would have difficulty after a day or two in summertime, unless demands were curtailed dramatically. Nearly all agencies have sufficient backup power or are purchasing additional generators to operate key facilities in a power outage. This is a beneficial effect of Y2K retrofits and the recent power crisis. Most agencies expect to spend money on security enhancements in the next few years.
Category 6 - Capacity/Local

Overall, agencies were confident in the ability of their systems to meet fire flow and peak day demand. A few areas with older, smaller pipes are undergoing replacement programs. Some bottlenecks in system capacity are being addressed in the next few years.

Category 7 - Capacity/Regional

In the basin, capacity concerns focus on the ability to get water into the basin for recharge. Remedies include adding new spreading basins along the river, investigation of injection wells for recharge, changes in the Metropolitan Water District indirect replenishment program (where water is taken from Metropolitan in lieu of pumping out of the basin); and completion of the Groundwater Replenishment System. Reliability is also a concern in South County, as portions of the area are served by a single feeder or treatment plant without significant looping or backup. As noted earlier, a study is underway to develop solutions. In South County, capacity needs to be added to the South County Pump station by Metropolitan, and eventually the major north/south artery, the Allen McColloch Pipeline (AMP), will require paralleling. Other potential capacity enhancements include completion of the Central Pool Augmentation Project (a large treatment plant and tunnel from Lake Mathews, or completion of an ocean desalter in South County (to alleviate demand on importation facilities).

Category 8 - Operations/Water Quality

All agencies reported serving water in compliance with state and federal drinking water regulations. Some agencies have had to remove a well or other source from service – temporarily or permanently -due to contamination or quality problems. In some cases, treatment has been added to solve the problem, in other cases a new deeper well that is less vulnerable to contaminated shallow groundwater has been developed. Most agencies are concerned about groundwater contaminants and their potential impact on our water supplies. Good source control, diligent monitoring and rapid cleanup were sited as needed precautions.

Category 9 - Operations/Maintenance, R&R

Most agencies have a formal or informal maintenance plan. Some agencies have none, but simply budget based on previous trends. Some agencies are using state of the art programmed maintenance software, which tracks all aspects of programmed maintenance.

Category 10 - Operations/Efficiency, BMPs

The good news is that Orange County has one of the best track records in water use efficiency. Although only half of the agencies surveyed have signed the statewide memorandum of understanding for water use efficiency best management practices (BMPs), many agencies are complying with many of the BMPs. These BMPs will be mandated in the near future. Often this compliance comes through regional programs implemented by Metropolitan or MWDOC. Funding for regional programs is limited, and therefore not all BMPs have been or can be pursued diligently. There is a strong link between increasing landscape irrigation efficiency and reducing harmful urban runoff.
VII. References

• Report Card Evaluation Criteria
• List of Agencies Interviewed
• Reference Materials Description
• Copy of Survey/Interview Format
B. Committe Structure

- Executive Committee
- Infrastructure Working Committees
- Expert Review Councils
- Public Relations