Orange County Sanitation District 2025 Risk Register

The Orange County Sanitation District Risk Register is a biennial working document that guides OC San's daily operations and supports the Strategic and GM Work Plans. It provides an internal assessment of strengths, weaknesses, risks, and opportunities, along with external influences identified by the Executive Management Team (EMT) and Managers.

How is the information gathered?

As part of the process, managers were asked to complete two types of analysis—one focused on internal areas that OC San can directly influence, and another on external factors that OC San must remain aware of, as they may affect organizational operations:

- **SWOT Analysis — A strategic planning tool that evaluates:**
    - Strengths (internal capabilities),
    - Weaknesses (internal limitations)
    - Opportunities (external factors the organization can leverage, and
    - Threats (external risks or challenges).
- **PEST Analysis — A framework for examining external influences in four domains:**
    - Political, Economic, Social, and Technological factors.

These tools informed OC San's operational and strategic decision-making process.

How Is the Information Processed and Organized?

After collection, responses were reviewed and refined through an iterative process supported by AI prompt engineering. This iterative review process standardized language, reduced redundancy, and enhanced clarity.

The word cloud on the following page highlights recurring language and common themes, offering a visual snapshot of OC San's shared concerns and areas of focus.

The AI-assisted review was conducted over multiple rounds, with input from select EMT members to validate key points and ensure alignment with OC San's strategic priorities.

The final output is organized into three established sections:

1. Strengths and Weaknesses, grouped into categories using AI support and EMT review
2. Opportunities and Threats, each paired with recommended action plans
3. PEST Analysis, summarizing external factors relevant to OC San's planning environment

SWOT Analysis

2025 Strengths and Weaknesses

In prior reports, strengths and weaknesses were grouped into four broad categories. This year, the inputs were reorganized into nine specific categories that more accurately reflect the range and focus of manager feedback. The strengths are presented first, grouped by category, followed by the corresponding weaknesses. This structure provides a clearer view of OC San's internal capabilities and areas for improvement across key operational and organizational themes.

Key takeaways include strong performance with few weaknesses in Financial Management and Governance, suggesting overall strategic stability. Talent Acquisition and Succession shows a mix of strengths and concerns, particularly around staffing, while Asset Management reflects issues related to aging infrastructure. Technology, Project Delivery, and Field Operations reveal operational friction and complexity, highlighting opportunities to improve support, training, and process alignment.

Strengths

Category: Talent Acquisition & Succession

1. Financial Management division has trained and highly knowledgeable staff in their respective subject areas
2. IT teams demonstrate strong technical expertise and collaboration across functions
3. IT leadership team shows strong continuity, with no impending retirements or succession risks
4. Strong institutional knowledge across divisions that supports continuity and informed decision-making
5. Staff demonstrate practical knowledge, clear understanding of technical requirements, and sound decision-making when addressing problems
6. OC San recruits and retains skilled professionals by investing in training, mentorship, and development programs
7. Consistent teamwork, communication and collaboration across shifts and between Plants that enhances staff continuity and cohesion

Category: Training & Development

8. Highly skilled staff trained in the appropriate technical areas of facility maintenance
9. Managers and supervisors work closely to ensure effective coordination and communication
10. Established training and cross-training programs that support staff development and reinforce clear goals and expectations across roles
11. Centralized Training Program includes defined training profiles by classification to support targeted onboarding and development for new and recently promoted employees
12. Thorough onboarding process to increase retention and engagement

Category: Field Operations & System Performance

13. Strong desktop procedures play a critical role in ensuring consistency, efficiency, and accountability in daily operations and onboarding
14. On-hand equipment and supplies designed to manage critical incidents effectively
15. Strong capacity management practices ensure consistently low Sanitary Sewer Overflow rates, reflecting effective system oversight and environmental compliance
16. Well-established Standardized Operating Procedures and interdepartmental coordination ensure rapid response to permit excursions and sustained regulatory compliance
17. Dedicated Operations team members who are committed to their craft and bring deep expertise to essential agency functions
18. Recognition from agencies like California Water Environmental Association (CWEA), Santa Ana River Basin Section (SARBS), and National Association of Clean Water Agencies (NACW) highlights OC San's award-winning Operations staff and reinforces our commitment to operational excellence and industry leadership

Category: Safety & Emergency Preparedness

19. Dedicated security team to protect the treatment facilities and administrative buildings
20. Established safety & health policies and procedures to ensure worker and public safety
21. Comprehensive emergency response protocols tailored to sanitation operations
22. Strong partnerships with local government agencies, fire departments, and emergency services
23. Well-documented standard and emergency response plans that enhance operational readiness
24. Established barriers and controls such as fences, gates, and access-controlled points
25. Regular safety and health training for employees and contractors
26. Strong track record of adhering to federal, state, and local health and safety regulations
27. IT maintains a strong safety record, with zero incidents and full compliance in safety training
28. Skilled risk management professionals to oversee safety management system and manage risks

Category: Technology & Systems Resilience

29. Change management processes follow ITIL best practices, with a formal change advisory board that reviews rollout and backout plans, identifies risks, and ensures release information is shared with support teams and subject matter experts
30. Use of a budget tool in JDE supports transparency and improved oversight of IT expenditures
31. IT remains agile in its approach, providing adaptable solutions across a broad range of operational challenges
32. Customer service remains consistently strong and is reinforced by regular user surveys and feedback mechanisms
33. ESD team demonstrates exceptional resilience, sustaining service levels and adapting to increased demands from regulations, new technologies, and capital program
34. A structured standards update process (EDAC) ensures technical consistency, continuous improvement, and alignment with industry best practices
35. Maintain strong professional relationships with regulatory agencies and industry associations, fostering collaboration and regulatory alignment
36. Collaborative culture and innovation strengthens resilience and promotes continuous improvement

Category: Asset Management & Infrastructure Reliability

37. OC San staff have extended the service life of critical instruments through disciplined maintenance, overcoming prior run-to-failure practices
38. OC San has invested in significant vessel upkeep to extend its operational life
39. High asset availability supports uninterrupted plant processes and reliable operation of collection pump stations
40. Facilities and lab staff sustain compliance and functionality in aging infrastructure despite ongoing power, HVAC, and water intrusion challenges
41. An expanding reliability-based maintenance program enhances equipment performance, reduces unplanned downtime, and extends asset life
42. Asset management strategies guide long-term Capital Improvement Plans to effectively maintain and upgrade treatment facilities
43. OC San's asset management program is well-established, actively evolving, and aligned with long-term improvement goals

Category: Project Delivery & Execution

44. Engineering demonstrates strong project execution capabilities and effectiveness in managing a high volume of projects
45. Engineering has advertised its first Progressive Design-Build (PDB) project, an innovative delivery method that enables early team selection, fosters collaboration, and improves outcomes for complex projects
46. Engineering and O&M continue to strengthen collaboration to improve alignment and outcomes across project lifecycles
47. Engineering maintains a strong commitment to continuous improvement, consistently seeking ways to enhance work practices
48. Engineering has updated divisional policies and is actively revising RACI charts in the Project Management Manual to clarify roles and strengthen cross-functional collaboration
49. Expansion of PMWeb to support workflows beyond construction activities enhances cross-functional coordination and process consistency
50. Engineering is using a data-driven approach leveraging Power BI to enhance project controls and project management, improve performance tracking, and support more informed decision-making
51. Construction management and plant operations teams work collaboratively to align priorities, ensuring efficient project delivery and minimal operational disruption
52. Clear accountability and consistent implementation of lessons learned from completed work tasks, supporting ongoing improvement and efficiency

Category: Financial Management

53. OC San adheres to all financial reporting requirements, ensuring regulatory compliance and transparency, and has earned the GFOA Award for Excellence in Financial Reporting for 31 consecutive years
54. OC San holds the highest credit rating, AAA, reflecting its strong financial stability and enabling access to lower interest rates with investors
55. Financial processes are completed accurately and on time, ensuring vendors are paid, staff receive paychecks, reporting is fulfilled, and customers receive rebates, which enhances OC San's reputation as a leading public agency
56. Financial stability supported by a strong history of sound fiscal management and diversified funding through ratepayers, bonds, and grants
57. OC San conducts long-range financial planning to maintain reserve levels above policy requirements, balancing the need to fund expenditures with the goal of minimizing annual impacts on customer rates
58. Within the Financial Management division, the Project Controls discipline supports other departments through project data analysis, quarterly budget meetings, and by providing cash flow and scheduling data to assist CIP planning and execution

Category: Governance and Compliance

59. Highly skilled, certified staff that drive agency excellence and high-quality public service
60. Increased collaboration with Legal and external agencies supports defensible decisions, risk-aware planning, and balanced standardization with operational flexibility
61. Established relationships with board members, local agencies, and industry that strengthen strategic collaboration
62. Clear mission and strong public trust that sustain community support for essential services
63. Strong reputation among agency peers and regulators
64. With over 70 years of service, OC San has built a trusted reputation for excellence and reliability in wastewater management
65. An integrated network of collaborative, innovative and capable vendors
66. Well-defined processes, procedures, and policies that ensure operational efficiency and regulatory compliance
67. Comprehensive policies and procedures ensure consistency, clarify roles and responsibilities, and support compliance to protect both employees and the organization

Weaknesses

Category: Talent Acquisition & Succession

1. Limited redundancy in key accounting knowledge areas due to insufficient cross training and resource capacity risks creating institutional knowledge gaps if key staff separate from OC San
2. While highly skilled and dedicated, the Purchasing staff's relative inexperience may affect the quality and timeliness of departmental work
3. No succession management plan is in place for Mobile Crane Operators, posing a risk as retirements approach
4. Limited succession planning and cross-training increase the risk of knowledge loss during staff transitions
5. Single incumbent classifications that are the only source of knowledge for key processes
6. Missing promotional paths across Resource Protection Division classifications create ambiguity around advancement opportunities and may impact retention and engagement
7. Average staff experience has declined in recent years, with more employees new to OC San or stepping into roles with less prior experience than in the past
8. Potential retirements among Contracts staff over the next 3–5 years could disrupt operations if departures occur simultaneously
9. Retirements reduce depth of historical knowledge, despite stable operations and knowledge-sharing practices. While we have a strong team, developing the depth of on-the-job experience required to fully replace seasoned staff takes time
10. Supervisorial aspirations may be tempered by the feeling that the difference in pay doesn't account for the responsibility

Category: Training & Development

11. The lack of a standardized process for knowledge transfer creates vulnerability when staff depart, particularly when departures occur without sufficient transition planning
12. While staff are skilled and dedicated, limited experience among newer employees may contribute to inconsistent performance and slow the pace of onboarding
13. Difficulty hiring technical staff limits resiliency, slows knowledge transfer, and reduces career development, increasing turnover risk and reliance on contract labor
14. Constraints in onboarding and knowledge transfer extend learning curves for new or promoted staff
15. Lack of clear development paths for staff inhibits long-term engagement and succession readiness

Category: Field Operations & System Performance

16. Aging treatment systems and deteriorating equipment increase the likelihood of unplanned failures
17. Too many meetings limit availability for focused, field-based tasks like preventive maintenance
18. O&M staff report insufficient training and inconsistent manual distribution during facility turnover, causing operational challenges and delays in maintenance planning
19. Growing dependence on technology increases vulnerability to service disruptions and adds pressure to ensure reliable, timely IT support
20. Highly complex operations spanning two treatment facilities and 200+ miles of pipeline require strong coordination, particularly during emergency conditions

Category: Safety & Emergency Preparedness

21. IT staff has minimal knowledge to support non-IT control systems (e.g., PLCs, SCADA), increasing response time during system failures
22. Inconsistent safety messaging across diverse teams may lead to misunderstanding and uneven adherence to protocols
23. Use of aging personal atmospheric monitoring equipment may reduce employee confidence in readings and increase the risk of unsafe working conditions
24. Chain-link fencing around the perimeter of the plant is not designed to deter a determined intruder
25. Limited CCTV coverage at treatment plant facilities creates vulnerability in physical and operational security
26. Lack of technical knowledge of life safety systems creates risk during emergencies or maintenance
27. Limited real-world emergency response experience among Emergency Operations Center staff may delay coordination efforts during an actual emergency

Category: Technology & Systems Resilience

28. Knowledge of systems resides primarily with Subject Matter Experts (SMEs) and is not well-documented, creating long-term support risks
29. Aging infrastructure necessitating significant reinvestment in both physical and digital systems to sustain reliability and performance
30. IT is stretched thin supporting hundreds of systems, limiting ability to drive innovation or deliver new initiatives
31. IT is often engaged late in projects, limiting its ability to shape outcomes and avoid downstream inefficiencies
32. Dependence on legacy processes and the various limitations of existing applications slow efficiency and reduce visibility

Category: Asset Management & Infrastructure Reliability

33. Insufficient recurring training on CMMS workflow and asset management
34. Under-trained Fleet Automotive/Heavy Equipment Technicians may increase the risk of equipment breakdowns and delay response times
35. Facility repair backlog continues to grow due to prioritization of critical issues and limited resources
36. Obsolete equipment challenges repair efforts, increases downtime, and complicates spare part sourcing
37. Limited availability of higher-level trade positions (e.g., Mechanical Technicians) may lead to gaps in maintenance expertise and task coverage
38. Lack of asset management plan pertaining to civil structures and systems such as HVAC leading to unmitigated failure conditions
39. Maintenance reports are underutilized in informing long-term maintenance strategy and asset renewal planning

Category: Project Delivery & Execution

40. Many small projects require disproportionate resources to manage and execute, reducing overall efficiency and straining available staff capacity
41. Engineering is operating at full staff capacity, limiting flexibility to respond to urgent needs without reprioritizing or delaying existing projects
42. Most construction projects are delayed, slowing the pace of improvements and eroding confidence in schedules
43. Project timelines and design phase constraints sometimes limit operational input, affecting maintainability and long-term performance
44. Traditional capital project delivery methods reduce flexibility and may limit innovation in addressing emerging challenge

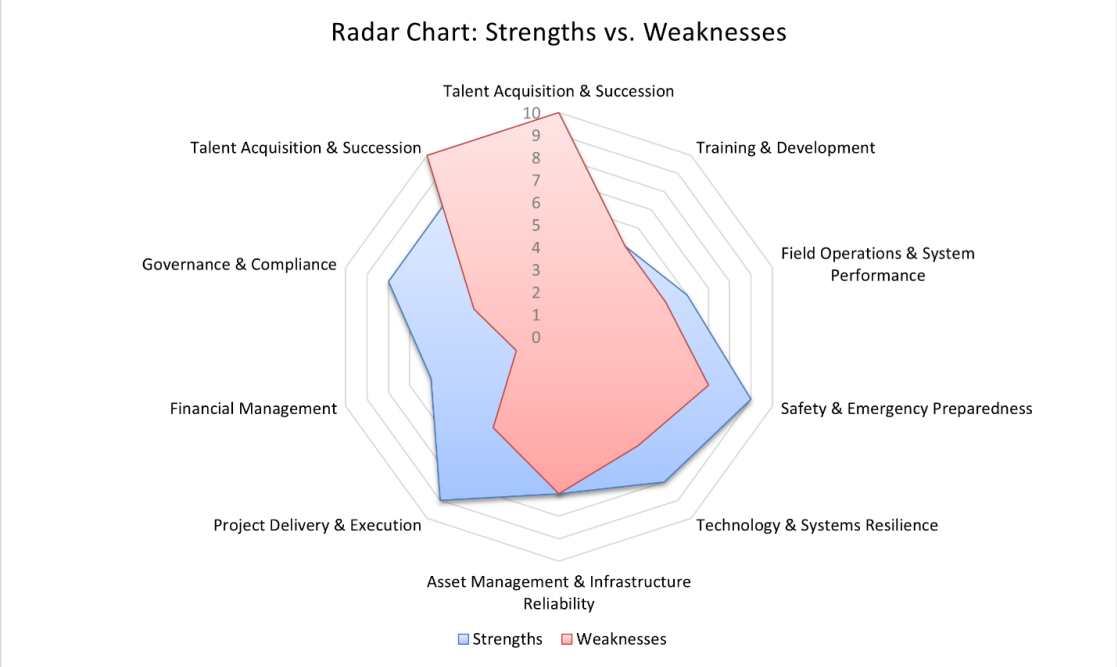
Category: Financial Management

45. Manual accounts payable processes for vendor invoices reduce transparency in approval status and increase the risk of delayed payments and human error
46. Budget constraints limit the ability to rehabilitate aging infrastructure and ensure adequate coverage for ongoing needs

Category: Governance & Compliance

47. Lack of a obsolescence plan for mechanical, electrical, and control system components
48. Lack of performance metrics or KPIs to assess performance or guide continuous improvement
49. Tendencies toward siloed work and reluctance to share information across divisions can reduce alignment and efficiency
50. Real property matters such as acquisition, disposition, and easement coordination often take longer than anticipated
51. Inconsistent internal communication between divisions creates confusion and undermines shared accountability

Category-Level SWOT Balance



This radar chart shows the frequency of strengths and weaknesses across key operational categories. It highlights where OC San has strong internal capabilities and where strategic vulnerabilities remain.

2025 Opportunities and Threats/Risks

This section highlights the most strategically significant opportunities and threats identified through the SWOT analysis. Each item includes a summary and an associated action plan to support informed decision-making and forward-looking planning.

Opportunities are presented first, in ranked order, followed by threats. Each entry was reviewed by subject matter experts for accuracy, clarity, and alignment with OC San's operational context. Similar or overlapping inputs were occasionally combined for a more cohesive and actionable summary. Action plans were developed or refined in parallel to reflect practical steps for addressing each issue or opportunity. This structure supports prioritization and guides OC San's response to both potential growth areas and emerging risks.

Ranked opportunities emphasize technology, efficiency, and workforce development. Key threats include cybersecurity, regulations, aging infrastructure, and staffing continuity. These findings reinforce the need for ongoing investment in resilience, modernization, and coordination.

Opportunities

Rank 1 | Deep Well Injection

Opportunity: Continue to pursue the viability of deep well injection to enhance operational flexibility, simplify dewatering operations, reduce chemical usage, decrease the number of digesters requiring operation and maintenance, and eliminate dependency on contractor-provided biosolids trucking

Action Plan: Support ongoing engineering study with operational input; review findings to determine long-term feasibility and implementation requirements

Rank 2 | AI & Automation

Opportunity: Build on current investments in AI, automation, and real-time monitoring to expand predictive maintenance, empower staff with intelligent tools, reduce downtime, and accelerate data-driven decision-making across the agency

Action Plan: Develop a unified smart infrastructure roadmap by integrating existing and emerging technologies—including AI-driven monitoring, predictive analytics, intelligent automation, and platforms like Copilot—to reduce downtime, enhance safety, boost workforce efficiency, and enable data-informed decisions, while coordinating with IT, Operations, Maintenance, and Engineering to ensure scalability and system integration

Rank 3 | LOTO

Opportunity: Embed LOTO (Lockout/Tagout) procedures into project handovers to improve safety and accelerate maintenance readiness for new equipment

Action Plan: Initiated discussions with Engineering to embed LOTO procedures in project handovers, with follow-up planned to finalize implementation

Rank 4 | Capital Project Lifecycle Improvement

Opportunity: Improve project outcomes and readiness by aligning design, planning, asset data, and risk management into an integrated, lessons-informed framework that enhances coordination, reduces delays, and strengthens long-term capital delivery

Action Plan: Advance the capital project lifecycle by integrating asset condition data and risk-based planning into project decisions; formalize lessons-learned feedback loops and EDAC participation to improve design standards; proactively manage long-lead equipment and replacement parts; clarify lifecycle roles and permitting steps; align records and reporting with updated policies; and streamline progress tracking to reduce burden and improve clarity across teams

Rank 5 | Workforce Readiness

Opportunity: Strengthen OC San's long-term capabilities by investing in technical certifications, cross-functional training, and succession strategies that build a resilient, future-ready workforce equipped to support evolving technologies and operational demands

Action Plan: Build on existing workforce programs by expanding cross-training, onboarding, and certification opportunities; enhance technical readiness through targeted training in safety, emergency response, and emerging technologies like EVs; and strengthen long-term resilience through strategic use of succession planning tools and capability assessments

Rank 6 | Digital Financial Transformation

Opportunity: Unlock operational efficiency, elevate customer experience, and strengthen long-term fiscal agility by digitizing financial systems, automating workflows, and using real-time insights to guide investment and planning decisions

Action Plan: Implement digital financial solutions such as accounts payable automation, online payment platforms, and a customer portal to improve accuracy, transparency, and compliance; assess and optimize finance workflows to increase staff capacity; and collaborate with the investment manager to adapt the agency's portfolio strategy in response to market shifts, maximizing returns while preserving safety and liquidity

Rank 7 | Cybersecurity (Red Team/ICS)

Opportunity: Proactive investments in cybersecurity are reinforcing the GM's policy directive and creating opportunities to advance agency-wide digital security

Action Plan: Perform a Red Team assessment of the ICS SCADA system and conduct a ransomware readiness review to enhance cyber resilience across critical systems

Rank 8 | Safety & Security Modernization

Opportunity: Enhance facility safety, emergency readiness, and physical security by modernizing systems, strengthening compliance measures, and expanding partnerships that reduce risk and improve real-time responsiveness

Action Plan: Upgrade safety infrastructure across plants and headquarters by expanding CCTV coverage, replacing outdated public address systems, and implementing AI-based monitoring tools; reinforce security by performing background checks and strengthening entry protocols; enhance contractor oversight to ensure safety compliance; and formalize partnerships with emergency services to support joint preparedness, response coordination, and critical incident training

Rank 9 | Lab Infrastructure and Compliance Modernization

Opportunity: Modernize laboratory systems and planning to maintain high service levels, ensure regulatory compliance, and strengthen asset reliability through digital upgrades and forward-looking capital forecasting

Action Plan: Upgrade laboratory data systems to enhance reporting accuracy and compliance; align staffing and service delivery with growing internal demand; and implement obsolescence planning and capital forecasting to ensure infrastructure and equipment meet future regulatory and operational requirements

Rank 10 | New Metering Technology

Opportunity: Improve process accuracy and operational control by applying new metering technology to measure actual flow conditions, as demonstrated at the Trickling Filters in Plant 2

Action Plan: Apply new metering technology to process flows, to determine actual flow instead of average flow, dependent on which pumps are operating, as in the case of the Trickling Filters at P2

Rank 11 | Cloud Based Modernization

Opportunity: Accelerate the transition to cloud-based systems, improve operational efficiency, and enhance business continuity by modernizing legacy platforms, standardizing IT practices, and strengthening disaster recovery capabilities

Action Plan: Advance the replacement of legacy systems—including timecard, Primavera, Bold Planning, and HR support tools—with secure cloud-based solutions; implement a unified ticketing system to streamline internal service delivery; and improve IT resilience by standardizing documentation across in-house and vendor platforms, while regularly testing disaster recovery procedures to ensure continuity of critical operations during disruptions

Rank 12 | Regional Composting Partnership

Opportunity: Partner with OC Waste & Recycling to lead regional food waste and biosolids composting efforts

Action Plan: Maintain active dialogue with regional POTWs and OCWR to align priorities and plans

Rank 13 | Potable Reuse Storage

Opportunity: Enhance our water recycling capabilities to support potable reuse initiatives and strengthen storage infrastructure in drought-prone regions of California

Action Plan: Increase Secondary systems process capability, by increasing storage of water that goes to GWRS, to decrease the amount of non-potable plant water used in process areas

Rank 14 | Shutdown Packet Standardization

Opportunity: Implement comprehensive shutdown packets at project delivery to enhance operational readiness, reduce downtime, and improve execution transitions, following the successful model established by P2-122

Action Plan: Continue engaging with Engineering to finalize and implement standardized shutdown packets, ensuring alignment on scope, timing, and transition details

Rank 15 | Digital Communication Tools

Opportunity: Expand digital transformation initiatives by strengthening virtual board capabilities, enhancing media analytics, and advancing public engagement tools

Action Plan: Continue to implement a secure and user-friendly platform for virtual board meetings and continue with media monitoring with the existing tools to track public sentiment and digital outreach strategies

Rank 16 | Standardizing Internal Forms and Procedures

Opportunity: Improve efficiency, reduce errors, and strengthen collaboration by standardizing key procedures and forms across divisions to ensure consistency, clarity, and ease of use

Action Plan: Conduct a cross-divisional review to identify, consolidate, delete, or modify procedures and forms in use; standardize high-value templates through collaborative input; and implement shared tools and training to ensure consistent application, reduce redundancy, and improve staff efficiency

Rank 17 | Advanced Treatment Solutions

Opportunity: Deploy advanced treatment solutions like Supercritical Water Oxidation to address PFAS, microplastics, and emerging contaminants

Action Plan: Coordinate research through the Research Technical Advisory Group and external partners (e.g., Isle Utilities) to evaluate technology fit and readiness

Rank 18 | Strategic Communications & Community Engagement

Opportunity: Capitalize on raising environmental awareness and public demand for transparency to expand OC San's influence, deepen community trust, and position the agency as a regional leader in education, advocacy, and sustainability partnership

Action Plan: Expand public education programs such as WasteWater 101, launch targeted outreach campaigns on sustainability and environmental stewardship, and proactively publish key decisions and updates to reinforce transparency; partner with schools, research institutions, nonprofits, and public agencies to co-host events, share expertise, and advance shared policy goals through community engagement and advocacy

Rank 19 | EV Charging Infrastructure

Opportunity: Pursue EV charging infrastructure through the SCE Charge Ready program
Action Plan: Engage with SCE to assess program fit and deployment potential for OC San

Threats/Risks

Rank 1 | Cybersecurity Vulnerability

Threat: Cybersecurity threats, including data breaches, remote access vulnerabilities, and SCADA system staffing limitations, jeopardize the agency's ability to maintain secure and resilient operations; compounded by risks of infrastructure vandalism, facility outages, and equipment damage, these threats may disrupt communications, degrade lab and compliance functions, and compromise sensitive board and public engagement materials

Action Plan: Enhance cybersecurity resilience by conducting regular risk assessments, strengthening intrusion prevention and VPN security, enforcing multi-factor authentication, and auditing remote access practices; implement automation strategies in SCADA and IT operations to mitigate staffing limitations, while promoting staff training on cyber hygiene, phishing, and data handling; support infrastructure security through cross-functional coordination with Risk Management, IT, and Engineering to maintain service continuity and protect systems and communications

Rank 2 | Outdated Cross Connection Program

Threat: Cross connection control program is outdated and lacks appropriate resources to ensure compliance with Orange County Health Care Agency

Action Plan: Identify deficient areas and resources required to ensure compliance and update procedures accordingly

Rank 3 | IT Resilience and Business Continuity Gaps

Threat: Gaps in business continuity planning, limited disaster recovery testing, environmental risks to IT infrastructure, and vulnerabilities such as internet outages or system unavailability threaten continuity of operations and could disrupt essential services, including paperless finance functions

Action Plan: Advance business resilience by replacing the Bold Planning system for Continuity of Operations Planning, addressing environmental risks to IT systems, testing disaster recovery procedures, and implementing connectivity failovers and finance-specific workarounds to sustain critical functions during service interruptions

Rank 4 | Procurement and Inventory Risks to Delivery and Readiness

Threat: Strategic procurement constraints — including limited contractor availability, supply chain disruptions, and the absence of purchase price contracts for nearly half of OC San's inventory — are exposing the agency to material supply risks and cost volatility. Delays of 6–18 months for uniquely specified components (e.g., pumps, valves, panels) further threaten project timelines and operational readiness

Action Plan: Expand strategic contracting, improve supplier coordination, and prioritize critical inventory coverage to reduce lead times and ensure timely delivery of operational and capital project needs

Rank 5 | Regulatory Constraints on Technology and Resilience

Threat: Restrictive or evolving regulations could delay or prevent the deployment of advanced technologies like Supercritical Water Oxidation, increase compliance risk through unvalidated modeling and emerging contaminant standards, and impair OC San's operational resilience by driving up fleet, safety, and residual management costs

Action Plan: Monitor legislative and regulatory developments, engage Cal/OSHA and other agencies to influence policy, and collaborate with regional partners to enable transformative technologies like Supercritical Water Oxidation, strengthen compliance readiness, and align reuse and safety strategies with evolving standards

Rank 6 | Compliance and Workforce Safety Vulnerability

Threat: Shifting regulatory requirements and the potential for workplace accidents present a safety and operational threat that could increase costs and disrupt essential services if compliance measures, and safety protocols are not proactively strengthened

Action Plan: Review and prepare for upcoming safety regulations, enhance internal safety policies and training, and proactively implement improvements that reduce risk and ensure operational continuity

Rank 7 | Workforce Risk to Service Delivery and Compliance

Threat: Accelerated retirements, limited succession planning, and high turnover are reducing institutional knowledge and continuity, while constrained staffing levels and difficulty hiring skilled workers—especially engineers, operators, and mechanical technicians in a competitive labor market—are limiting OC San's ability to meet regulatory, capital, and service demands, increasing risk to project delivery and operational stability

Action Plan: Strengthen workforce continuity by expanding succession planning, accelerating onboarding, and enhancing recruitment and retention strategies that promote long-term engagement and support the broad distribution of critical expertise, while addressing staffing constraints and labor market challenges in recruiting skilled engineering, operations, and mechanical personnel

Rank 8 | Aging Infrastructure and System Reliability Gaps

Threat: Failure to replace aging lab equipment, upgrade SCADA and PLC systems lacking backups, and address inaccurate asset registry predictions could result in system failures, inspection backlogs, and unplanned maintenance that strain OC San's operational reliability and safety

Action Plan: Establish a proactive lifecycle and asset management program to prioritize equipment replacement, enhance data-driven decision-making, and coordinate with internal and external partners to ensure compliance and operational continuity

Rank 9 | Security and Infrastructure Resilience Risks

Threat: Natural disasters, facility intrusions, infrastructure failures, and drone-based threats jeopardize operational integrity, public safety, and environmental compliance by increasing the risk of service disruption, contamination, or targeted attacks

Action Plan: Strengthen infrastructure and security resilience through enhanced access controls, drone defense measures, seismic and hazard planning, and cross-agency emergency response coordination

Rank 10 | Delivery Risk from Resource, Design, and Consultant Challenges

Threat: OC San's capital project outcomes are affected by resource limitations, delayed input, and coordination challenges across divisions and consultants, including time spent onboarding new consultant staff unfamiliar with OC San standards, as well as schedules based on optimistic assumptions or limited project-specific insight, increasing the risk of rework and missed timelines; this delivery risk is compounded by design oversights, limited contractor project management capabilities, and a reliance on short-term infrastructure rehabs, which may undermine long-term asset performance and operational efficiency if not addressed through stronger planning, standards, and oversight

Action Plan: Enhance capital project outcomes by improving cross-divisional coordination and timely input, implementing structured onboarding for consultants, and developing realistic schedules through early risk validation, while also strengthening design standards, expanding asset condition assessments, and aligning delivery methods to support long-term operational efficiency and lifecycle performance

Rank 11 | Biosolids Management & Hauling Risk

Threat: Limited management options and hauling capacity challenge OC San's ability to sustainably manage biosolids and address constituents of emerging concern (CECs)

Action Plan: Develop RFPs to secure diversified biosolids management and hauler capacity options

Rank 12 | Reputational Risk from Operational Incidents

Threat: Incidents such as spills, sanitary sewer overflows, odor complaints could decrease public trust and perceptions

Action Plan: Erosion of public trust could impact our standing in the local community, and lead to costly odor control methods, increased pump station oversight, and higher fees due to the loss of customers

Rank 13 | Delays to Major Initiatives from Political or Public Headwinds

Threat: OC San's ability to advance strategic initiatives may be affected by shifts in legislative or board priorities and by public misunderstanding or mistrust of major projects, which can delay implementation and redirect long-term planning efforts

Action Plan: Maintain alignment with external decision-makers through adaptable communications and proactive outreach, including public-facing materials and engagement strategies that build trust and clarify agency priorities

Rank 14 | Easement Condition Knowledge Gaps

Threat: Lack full understanding of condition of easements compromising property management

Action Plan: Collaborate with Engineering to create a Civil Facilities Maintenance concentration within the organization's asset management plan

Rank 15 | EV Infrastructure Gap

Threat: Lack of EV charging infrastructure for fleet vehicles expected to be acquired in the next fiscal year

Action Plan: Identify current and anticipated EV and alternative fuel needs of the fleet, and scope a project to install infrastructure that supports the growing number of these vehicles

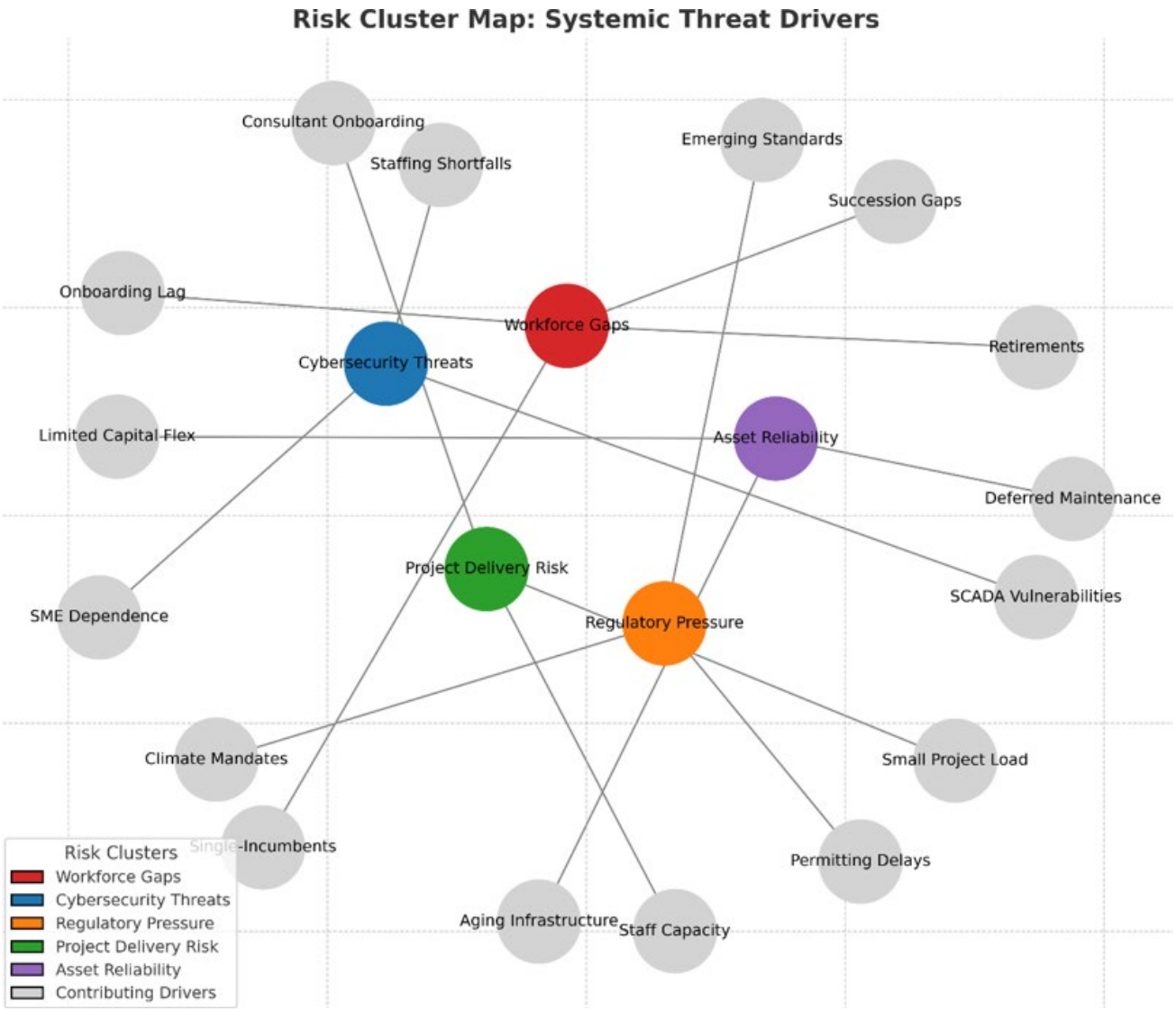
Rank 16 | Economic Uncertainty Impacting Financial Planning

Threat: Market fluctuations in interest rates, inflation, and adjustments to state or federal funding—including changes to subsidies or property tax allocations—pose a risk to long-term capital planning, reserve performance, and budgetary decision-making

Action Plan: Support financial planning resiliency by regularly reviewing investment strategies, maintaining flexible reserve and capital planning approaches, and evaluating scenarios for potential changes in subsidies or property tax revenues to inform long-term budgeting and funding decision

Synthesis of Systemic Threat Drivers

While each of the 16 threats present a distinct challenge, many are linked by common root causes — particularly staffing, infrastructure, coordination and regulatory pressure. The graphic below shows how these shared drivers converge among some of OC San's top threats.



PEST Analysis

In addition to the internal categories, OC San is affected by external factors—political, economic, social, and technological. While these areas are outside of OC San's direct control, the agency can influence them through planning and engagement. Participants completed a PEST analysis to examine these external influences. A summary of the results is provided below:

Political – Opportunities

- Engage proactively in legislative processes to shape policy outcomes
- Align with climate and infrastructure initiatives to maximize access to federal, state, and local funding opportunities
- Lead in shaping and exceeding environmental and safety regulations
- Build political capital through transparent governance, engaged board leadership, and active public participation in policy decisions
- Collaborate with industry and regulatory partners to enhance influence and alignment
- Leverage policy changes to streamline operations and improve internal efficiency
- Use science and innovation to shape policy and lead in emerging regulatory areas

Political – Threats

- Changes in government funding, tax policy, and subsidies strain fiscal stability
- Rising compliance complexity and regulatory mandates constrain flexibility and increase costs
- Leadership turnover and policy shifts destabilize funding, strategy, or support
- Permitting delays and administrative burdens slow progress and drain internal capacity
- High-stakes, complex regulations create legal and reputational risks
- Negative public perception of government work threatens talent recruitment and employee morale
- Coordination gaps with regional partners hinder shared project delivery and policy alignment
- Climate mandates advance faster than technology, straining operational feasibility

Economic – Opportunities

- Preserve strong credit ratings and maximize reserve returns to support long-term financial resilience
- Improve cost efficiency and flexibility through strategic vendor partnerships and cooperative purchasing
- Pursue government funding to support infrastructure upgrades and long-term capital investments
- Enhance performance through innovation, streamlined communication, and process optimization
- Invest in smart technologies and automation to improve reliability and reduce long-term costs

- Use technology to strengthen security, reduce operational risks, and enhance disaster preparedness
- Enforce fiscal policies to ensure full cost recovery and support long-term capital sustainability
- Improve budget predictability and capital planning through enhanced estimating and financial controls
- Use Progressive Design Build as a lower-cost, faster alternative that improves both design and construction outcomes
- Partner with private firms to advance biosolid reuse, energy recovery, and long-term waste reduction

Economic – Threats

- Inflation, interest rate shifts, and funding changes create revenue risk
- Rising costs from inflation, tariffs, and global supply trends strain budgets and construction bids
- Delays, vendor shortages, and material constraints disrupt procurement and project delivery
- Capital project delivery is jeopardized by inflation and cost volatility
- Labor market constraints and regional costs hinder recruitment and staffing
- Infrastructure deterioration drives up operational risk and maintenance costs
- Rising communication costs hinder outreach and transparency efforts

Social – Opportunities

- Foster community trust and engagement through education, outreach, and public involvement initiatives
- Meet rising expectations for transparency and sustainability through open communication and visible environmental leadership
- Leverage public interest in environmental issues to promote water reuse, conservation, and sustainability awareness
- Cultivate the next generation of professionals through partnerships with schools and internal culture-building
- Strengthen safety outcomes by collaborating with emergency responders, contractors, and local partners
- Coordinate with member agencies and watershed groups to address shared water management challenges
- Use digital platforms to expand public access, improve responsiveness, and enhance community participation
- Support a cohesive and adaptable workforce culture through hybrid work models and staff engagement
- Reinforce public and stakeholder confidence by maintaining strong financial credentials and governance

Social – Threats

- Spills, miscommunication, and financial scrutiny damage OC San's reputation and erode public trust
- Barriers to outreach limit inclusive communication with diverse and underserved communities
- Misinformation and narrative risks are amplified by social and traditional media
- Frequent turnover and shifting generational values erode institutional knowledge and organizational continuity
- Break-ins, offsite threats, and opposition to safety measures threaten operational security
- Odors, disruptions, and public stigma toward wastewater operations drive community pushback
- Plant proximity, construction impacts, and operational nuisances generate community opposition

Technology – Opportunities

- Use automation and AI tools to reduce manual work, improve accuracy, and shift staff toward higher-value tasks
- Deploy customer-facing platforms that enhance accessibility, transparency, and satisfaction across agency services
- Apply AI and smart monitoring tools to proactively detect issues, extend asset life, and improve maintenance outcomes
- Equip field and frontline teams with mobile tools and real-time collaboration platforms to boost responsiveness and agility
- Strengthen facility safety and risk management using sensors, robotics, and automated detection technologies
- Leverage digital systems to improve asset tracking, resource planning, and performance forecasting
- Adopt emerging construction and treatment technologies to accelerate delivery, reduce risk, and improve system resilience

Technology – Threats

- Cyber threats and system breaches jeopardize digital platforms and critical infrastructure
- Outdated IT systems hinder operations and limit innovation
- Incomplete AI integration undermines operational and strategic benefits
- Lack of contingency planning increases risk of service disruption from digital failures
- Skill gaps limit staff readiness to support AI, automation, and digital systems
- Reliance on external vendors creates pricing, support, and service availability risks
- Weak data governance and recordkeeping undermine decision-making and long-term reliability

Conclusion

The 2025 Risk Register provides a current snapshot of OC San's internal priorities and challenges, informed by broad manager input and refined through subject matter expert review. The findings are intended to support updates to the Strategic Plan and GM Work Plan, while also serving as a practical resource for ongoing organizational improvement.

Several of the highest-ranked opportunities and threats in the 2025 report reflect themes raised in the 2023 Risk Register. Continued focus on workforce readiness, cybersecurity, digital modernization, and asset management demonstrates both progress made and the need for sustained attention in these areas. Likewise, recurring threats—such as cyber risks, regulatory constraints, and business continuity challenges—highlight the importance of long-term planning, cross-functional coordination, and investment in resilience.

Together, these inputs provide a roadmap for addressing operational risks, capitalizing on strategic opportunities, and supporting OC San's mission in a changing and complex environment.