RFQ No. 21-041

Development of a Comprehensive Asset Management Program

City of Carson, California

1/13/2022

→ The Power of Commitment

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01

Cover Letter

→ The Power of Commitment

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Irvine, California 92618
United States
www.ghd.com

City of Carson

RFP 21-041, Development of a Comprehensive Asset Management Program

Dear Members of the Evaluation Committee,

GHD is pleased to submit our proposal for performing the development and implementation of a Comprehensive Asset Management (AM) Program for the City of Carson (the City). GHD's proposal has been developed based on the requirements of the RFP, our extensive experience in implementing AM programs for municipalities, and our understanding of the City of Carson's needs, goals, and objectives for this project.

GHD is the originator, and world leader of Asset Management services - we literally wrote the book. Often imitated, but never duplicated, we pride ourselves in delivering real, effective solutions. There are no shortcuts or magic buttons. GHD believes in tailoring AM services to the specific needs of the City of Carson, bringing the **right** solution, for the **right** context, at the **best value** possible.

GHD's knowledge of the City of Carson, its assets encompassed in this effort, and understanding of the City's vision and mission bring significant insight and value. There is no learning curve - we understand how the Public Works Department operates and how to best support them. Our sole focus on this project will be on what is best for the City.

For this project, the GHD team has developed a project approach and work plan that:

- Implements a concise and scalable AM Framework that standardizes the asset management practices across the Facilities, Engineering and Business divisions of Public Works.
- Evolves and enhances its maintenance and asset management practices, focusing its resources on the most critical infrastructure needs.
- Streamlines its Public Works efforts- maximizing its effectiveness.
- Focuses its Capital Improvement Planning on the most critical/effective investments, and planning to reduce operational and financial risk.

Our team's approach brings together our asset management and technical experience with our specific expertise in risk reduction, Public Works operations, Roadways, Parks, and Facilities/Buildings to develop the AMP framework that is appropriate and fit for purpose for the City of Carson. Our approach to the **five main tasks** put forth by the City, and our **recommended sixth task** (development of an SAMP- Strategic Asset Management Plan), is outlined below:

1. Development of an Asset Register/inventory of the City's assets.
2. Risk Prioritization Plans with unique core risk mitigation factors, and business risk exposure management for the City of Carson's infrastructure.
3. Capital Replacement budgets that are risk-based and phased in to allow the implementation of mitigation strategies for extending asset life, where applicable.
4. Evaluation and selection of an effective Computerized Maintenance Management Software/ Enterprise Asset Management (CMMS/EAM) software platform to enable effective data collection, deployment of effective maintenance, and streamlined operations in Public Works.
5. An effective Project Management Plan and execution. Efficient and valuable project management and communication throughout the entirety of this project is criticial to the creation, delivery, and deployment of a successful Asset Management Program.

6. Development of a Strategic Asset Management Plan that focuses on effective maintenance and inspection and data collection to reduce risk, prevent failures, and provide accurate data to make informed decisions. This plan will effectively provide the City a foundation and strategy for effective implementation and sustainable success.

Our experience implementing AM programs tells us that people are central to the success of any program. GHD's proven collaborative approach focuses on gaining input in the development process from City staff throughout the project to drive change and embed AM practices within the organization. Our team not only has a long, successful resume in developing, supporting, and implementing Asset Management Programs, AM software and CMMS systems, but our delivery approach includes knowledge transfer from our industry-recognized team members. This knowledge transfer stems from GHD's formal courses, including the Advanced Asset Management training course at the University of Wisconsin (Madison), the Advanced Asset Management training course through Virginia Tech's Sustainable Water Infrastructure Management (SWIM) Center, and from serving as the primary asset management trainers for the US Environmental Protection Agency (EPA) and Water Environment Research Foundation (WERF). This experience and our large bench of resources will bring value and efficiency to this effort.

Ryan Johnson will serve as the Project Manager and lead the project team. Ryan is a GHD Executive Advisor with a focus in Asset Management for the Western US. Ryan has worked on multiple projects for the city of Carson's public Works Department, knows the staff and assets well, and is excited for the privilege to continue to grow his partnership with the city. Ryan has more than 15 years of experience developing and implementing Asset Management Programs for numerous California municipalities, including more than 13 years leading a public agency in the operations and maintenance management of its water and wastewater infrastructure.

To supplement our team, GHD is partnering with Westberg and White for this project. Westberg brings its leading role in the development and growth of advanced asset practices and its knowledge of the City of Carson, specifically with regard to the City's existing buildings and facilities, as well as data collection practices to support the key areas of developing the Asset Register and Asset Management Plans.

Thank you for the opportunity to provide the City with this proposal. We are confident that our combined approach and proposed team provides the right capability and experience to realize the City's goals, as well as providing the attention, value, and quality for which GHD is known. Our team is excited, ready and looking forward to working with you and your team.

Regards,

SIMON KAYE, A GHD PRINCIPAL

Senior Vice President
North America Market Leader

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RYAN JOHNSON

Project Manager
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02

Team Qualifications and References

→ The Power of Commitment

→ About GHD

GHD provides advisory, asset management, transportation planning and engineering, environmental, digital, and construction services to private and public sector clients. Operating globally and delivering services locally, we are able to offer clients the ability to develop a working relationship with our local staff while having access to our global experience base.

Put simply, we work where our clients work. Our business model is to work internationally and deliver locally.

GHD is a global leader in Asset Management as demonstrated below and continues to actively contribute to the development of Asset Management and Best Practices. As an Institute of Asset Management (IAM) Endorsed Trainer and Endorsed Assessor, we have significant capability to evaluate the maturity of an organization's asset- related practices, systems, and technologies, against the requirements of ISO 55000 to improve their practices. We understand these standards and frameworks, their different elements, and how they apply to Strategic Asset Management Program Implementation. For example, the USEPA framework's primary focus is on how to use asset data and turn it into knowledge, while the ISO and IAM frameworks are informative on implementing asset management systems into an organization. Today, GHD is one of the world's top engineering firms and is recognized by ENR as the 10th largest pure design firm globally and ranked #26 on ENR's 2020 Top 500 Design Firms list.

Firm Information

Established in 1928, GHD is a wholly owned subsidiary – a privately held international engineering firm owned by our people and operating across five continents. We are one of the world's leading professional services companies operating in the global markets of Transportation, Water, Energy & Resources, Environment, and Property & Buildings. Our people can offer decades of knowledge, as well as a deep understanding of the challenges facing businesses and communities today. We deliver projects with high standards of safety, quality, and ethics across the entire asset value chain. Driven by a client service-led culture, we connect the knowledge, skill, and experience of our people with innovative practices, technical capabilities, and robust systems to create lasting community benefits. GHD has 400+ employees in the US West with 4,000+ employees in North America and 10,000+ employees globally.

90+ years in operation
135+ countries served
200+ offices worldwide
$2.3Ⓑ revenue 2020
5 global markets
10Ⓚ people
50+ service lines

↳ Providing engineering, environmental, advisory, architecture, digital and construction services

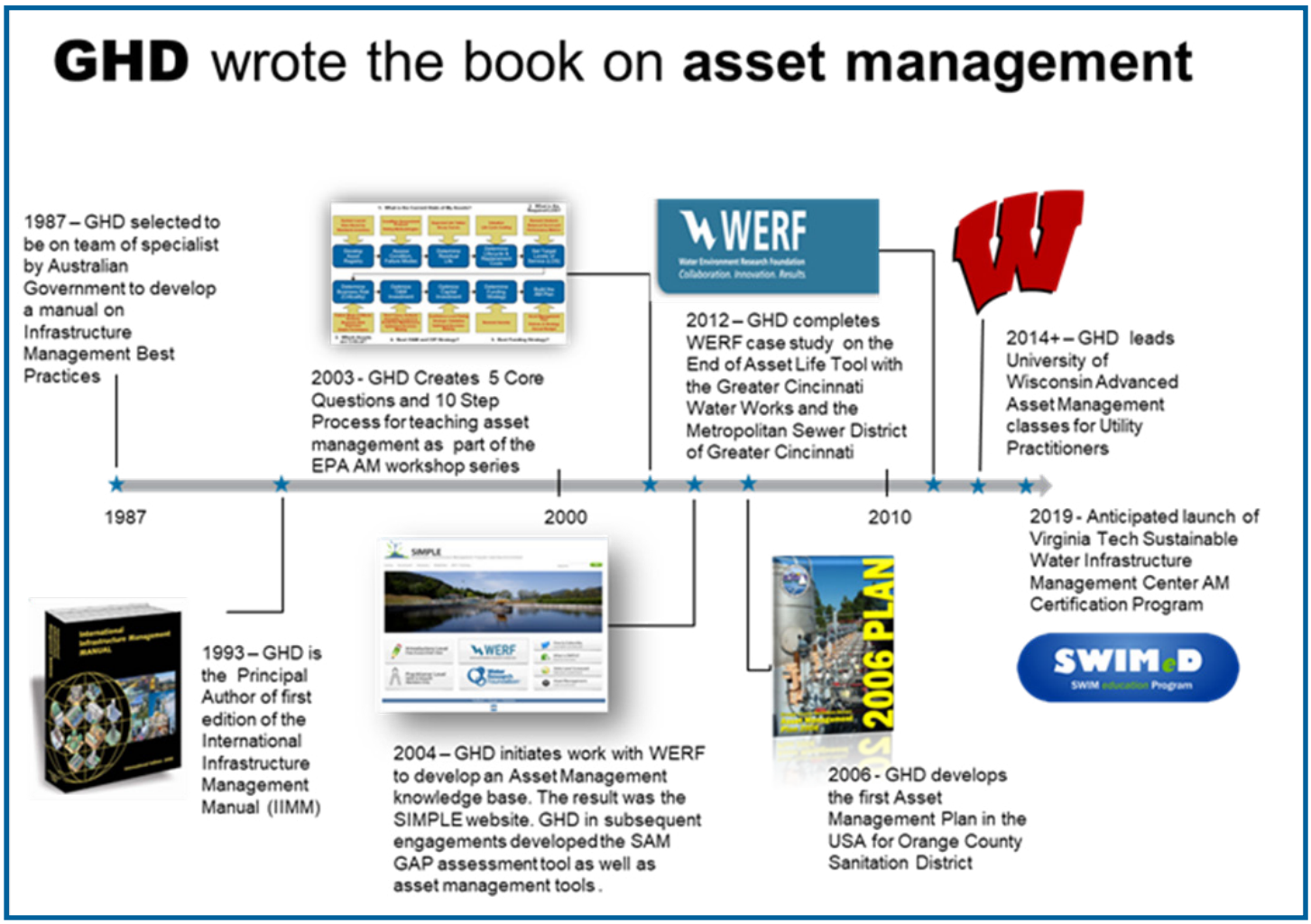
GHD California Office Locations

- Cameron Park
- Concord
- Emeryville
- Eureka
- Fresno
- Irvine
- Long Beach
- Los Angeles
- Redding
- Roseville
- Sacramento
- San Francisco
- San Luis Obispo
- Santa Rosa

GHD Asset Management

For over three decades, GHD has been a thought leader in asset management. We have extensive experience providing asset management and engineering services to Public Works organizations nationally and internationally. Our team understands how to define essential asset data needs, how to collect asset and condition data, how to analyze and use that data effectively, and how to synthesize and communicate coherent and compelling messages about current and future asset needs. We have developed numerous asset management plans that have helped our clients plan, forecast, install, operate, maintain, rehabilitate, and replace their critical assets. We place significant emphasis on developing asset management plans with our clients that are living, practical, impactful, and are not simply placed on a shelf once they are completed. In our experience, utilities are moving forward towards data-supported decision-making to proactively predict asset failure, develop capital improvement programs, and managing asset risk. However, it is sometimes difficult to make the leap from gathering data to using data for improved decision-making and risk management. Our team has extensive experience helping clients bridge that gap. As a world leader in asset management, GHD has played a significant role in the global development and growth of advanced asset practices. **We have worked with more than 500 Public Works and utility organizations** to identify key areas for improvement in service delivery and asset management. Our asset management consulting practice has been responsible for the concept and development of numerous advanced client processes and systems to assist the full integration of asset management systems and implementation tactics.

GHD actively contributes to the development of asset management best practice, demonstrated through our original authorship of recognized standards such as the US Environmental Protection Agency's 5 Core Questions and 10-Step Process, the International Infrastructure Management Manual (IIMM), and the provision of review services to the development of BSI's PAS-55:2008 which formed the basis for the ISO Standard for Asset Management (ISO:55000 series). GHD staff members served on the ANSI Technical Advisory Group for PS251 for the development of the ISO Asset



Management Standards and GHD is an Institute of Asset Management (IAM) Endorsed Trainer and Endorsed Assessor. This demonstrates our capability in evaluating and advancing the maturity of an organization's asset-related practices, systems and technology against the requirements of PAS-55:2008. GHD is also a charter member of the Institute for Sustainable Infrastructure (ISI). GHD has a significant number of Envision Sustainable Professionals and GHD staff have served as members of the ISI Board of Directors. GHD understands each of the various asset management standards/frameworks, what their different elements are and how they apply to practical, real-world asset management implementation. For example, the USEPA framework's primary focus is on how to use asset data and turn it into knowledge, while the ISO and IAM frameworks are informative from implementing asset management systems into an organization. One of the hallmarks of our asset management practice is our commitment to knowledge transfer. As such, we are proud to serve as the course instructors for the Advanced Asset Management Practices for Water and Wastewater Utilities at the University of Wisconsin – Madison. **GHD developed the first asset management plan in the United States back in 2006 for Orange County Sanitation District.** Since then, GHD has worked with over 65 clients in the United States to develop asset management plans and to provide asset management services.

Committed to You

GHD is dedicated to understanding and helping our clients achieve their goals. We are committed to sustainable development, safety, and innovation. We care for the well-being of our people, assist communities in need, and conduct business in an ethical and environmentally responsible manner. We can also offer our clients the confidence and peace of mind that comes from the fact that GHD is ranked 26th in the top 150 design firms by Engineering News-Record in 2020.

Relevant Experience

Below we present three (3) project references demonstrating our recent relevant experience and performance. As requested in the RFP, each reference, is from a different organization and includes the 1) Organization contact name, phone number, and e-mail address; 2) Project size and description, if applicable, and description of services.

Vallejo Flood and Wastewater District (VFWD), Asset Management Planning, Vallejo, CA

Contract Value: $859,000; Completion: Ongoing

Reference: Johnson Ho, Plant Operations and Maintenance Director

450 Ryder St., Vallejo, CA

707.315.6291

jho@vallejowastewater.org

Relevant Categories:

– Asset Categorization
– Risk Prioritization Plan
– Development of Capital Replacement Budget

Description

VFWD manages vertical and linear wastewater and stormwater assets. While the District currently meets the service level expectations of its customers and other stakeholders, there is growing concern that sustaining this performance into the future will become increasingly challenging as assets age. The District embarked on a multi-year, phased Asset Management (AM) Implementation Program to develop and implement leading AM principles and practices focused on improving the District's overall efficiencies and effectiveness in delivering services to its customers.

VFWD owns and manages vertical and linear wastewater and storm assets that deliver utility services to about 123,000 residents in the greater Vallejo, California area. An average of 10 mgd of wastewater flows through the VFWD's Ryder Street Treatment Plant on its way to the San Francisco Bay. During large storms, the peak hydraulic flow rate can reach 60 million gallons. The first phase of the program developed the AM Improvement Plan. This involved the development of the overall AM strategy, gap analysis, supporting improvement initiatives and roadmap as well as a pilot of key AM concepts in one area of utility operation.

Phase 2 included developing a pilot asset management plan on the solids process at the WWTP. Phase 3 is currently being completed, including buildout of the asset register, full plan for the treatment plant, and full plan for the collection system with 10 year investment profile.

Napa Sanitation District, Asset Management Plan Roadmap, Napa, CA

Contract Value: $315,000; Completion: Ongoing

Reference: Robin Gamble, Asset Management Analyst
1515 Soscol Ferry Road
Napa, CA 94558
Office Phone: 707.258.6031
Cell Phone: 707.312.1619
rgamble@napasan.com

Relevant Categories:
– Asset Categorization
– Risk Prioritization Plan
– Development of Capital Replacement Budget
– Software Evaluation

Description

GHD began working with NapaSan in 2016 to review asset management principles and program elements, perform a gap assessment of current practices, and develop a phased approach for implementing discrete tasks on a prioritized basis that would advance their asset management practices over time. The result was the AM Program Implementation Plan (roadmap).

NapaSan has an old collection system needing significant upgrades over time, and they needed to have a formal process utilizing asset data to make informed spending decisions that fit within budget constraints. This included ongoing maintenance of the treatment plant, collection system, and recycled water and biosolids infrastructures, as well as renewal/replacement of aging assets.

NapaSan will be able to implement much of the AM Program themselves, and will phase the work over several years to maximize the uptake of new tools and procedures by staff.

GHD is currently assisting NapaSan implement the SAMP Roadmap. Initial implementation tasks include development of a condition assessment protocol for wastewater facilities and support for selection of a new CMMS.

Water Replenishment District of Southern California, Enterprise Asset Management Master Plan and CMMS Implementation, Lakewood, CA

Contract Value: $1,050,000; Completion: Ongoing

Reference: Tom Knoell, Water Operations Superintendent
4040 Paramount Boulevard, Lakewood, CA 90712
562.275.4266
tknoell@wrd.org

Relevant Categories:
– Asset Categorization
– Risk Prioritization Plan
– Development of Capital Replacement Budget
– Software Evaluation

Description

The Water Replenishment District of Southern California (District) seeks to strengthen its AMP to realize the full benefit of their recent significant infrastructure investments that have been made to the District's Headquarters, Goldsworthy Brackish Water Desalter, Leo Vander Lans Advanced Water Treatment Facility, and the District's Groundwater Monitoring Well Network. The District has been implementing their AMP and since 2015 has made strong progress towards AM excellence. During this project GHD provided a wide range of AM assessment and roadmap services.

Asset Management Master Plan – As part of this effort, GHD assisted in developing an Enterprise AM Master Plan (EAMMP) to incorporate an AM vision, roadmap and strategy going forward. To achieve this, a gap assessment (consistent with ISO 55000) was conducted on the District's management practices, processes, data, technology systems, and people resources. Current practice levels were scored and compared against desired levels and industry benchmarks (ISO 55000), various improvement gaps identified and prioritized into a "roadmap" going forward. The EAMMP established a roadmap plan for AM implementation that included and integrated whole asset lifecycle analysis, data collection, business processes, information systems, decision analysis, project planning, upskilling personnel, right sourcing strategy and performance measurement.

IT Master Plan and CMMS Selection and Implementation – GHD worked closely with key staff to develop the IT Master Plan

and conducted a baseline assessment of information management practices with a specific focus on GIS, maintenance management and SCADA technologies. GHD facilitated the specification, selection, procurement, planning and pilot implementation for a new computerized maintenance management and works order system (CMMS). Phase 2 full CMMS implementation at an Advanced Water Treatment Facility and rollout to the other facilities is underway and ongoing.

Asset Management Plan for a Pilot Advanced Water Treatment Facility – GHD collected data (new field data and currently held as-built drawings and condition survey), developed an asset register, preventative maintenance plan and long-term financial strategy for a pilot facility. The work included lifecycle cost analysis based on age and condition of assets, development of risk-based prioritization of renewals works, a site specific 3-year program of works and an AMP based on the US EPA AM framework for the facility.

In addition to the above three references, GHD has additional extensive experience in performing similar projects. Three additional representative project summaries indicative of our significant experience and capabilities are provided below as additional information for City of Carson.

Plymouth Township Wastewater Asset Management Plan, Plymouth, MI

$2,400,000; Completion 2018

Description

GHD was engaged by the Charter Township of Plymouth, Michigan, to develop and implement a wastewater Asset Management Program that met the requirements of the Stormwater, Asset Management, and Wastewater (SAW) grant received by the Township. GHD developed an approach that most effectively leveraged the SAW grant to create a robust asset management framework for the Township's wastewater system assets that was implemented in a feasible, phased approach and that can be used for other Township infrastructure assets. Asset Management Program steps included

- Asset inventory and data collection
- Asset condition assessment
- Asset criticality and risk determination
- Investment prioritization and capital project development
- CMMS software and hardware selection

Relevant Categories:
- Asset Categorization
- Risk Prioritization Plan
- Development of Capital Replacement Budget
- Software Evaluation

GHD developed a risk prioritization framework and assigned replacement and rehabilitation costs. Final deliverables included a Collection System Asset Management Plan that included a 10-year O&M and capital investment plan and 5-year Capital Improvement Plan. GHD developed a requirements document and RFP for a GIS-centric work order management system and facilitated selection of a vendor.

Washington Suburban Sanitary Commission (WSSC), Utility-Wide Asset Management Program, Laurel, MD

Contract Value: $7,200,000; Completion: 2014

Description

GHD supported WSSC in developing and implementing a utility-wide Asset Management Program. The program was completed in multiple phases over several years. To effectively develop and implement asset management plans (AMPs) for its water and wastewater systems, GHD developed and embedded specific practices and protocols within the organization.

Relevant Categories:
- Asset Categorization
- Risk Prioritization Plan
- Development of Capital Replacement Budget
- Software Evaluation

Phase 1 involved the creation of a Strategic Level Enterprise Asset Management Plan (EAMP) and an Asset Management Implementation Plan (AMIP) based on the US EPA's AM Framework. As part of this effort, the GHD team completed an

assessment of WSSC's assets including, future capacity asset requirements, renewal needs, regulatory implications and financial inefficiencies.

The EAMP and the AMIP were used as "Roadmaps" for subsequent phases. Phases 2 and 3 focused on building on the work previously completed and emphasized implementation. As part of the implementation efforts GHD worked with WSSC to develop organizational improvements including recommending positions (Asset Strategy Managers) for different asset systems (e.g. water distribution, water facilities, etc.). GHD also developed the risk framework and asset replacement logic for implementation in the RIVA Decision Support System (DSS).

Santa Clara Valley Water District, Asset Management Plan, San Jose, CA

Contract Value: $669,000; Completion: 2015

Description

The Santa Clara Valley Water District developed a pilot Asset Management Plan (AMP) based on the US EPA framework as a means to document their asset management efforts to date and also to establish a standardized template for future District asset management plans. The District chose Reach 1 of the United States Bureau of Reclamation's San Filipe Division of the Central Valley Project as the pilot area for its first AMP.

Relevant Categories:

- Asset Categorization
- Risk Prioritization Plan
- Development of Capital Replacement Budget
- Software Evaluation

The pilot area included more than 400 assets, worth an estimated $432 million. The inventory of the pilot area included both horizontal and vertical assets. The pumps, motors, and other vertical assets of the Pacheco pump station made up the majority of the asset inventory, while the Pacheco conduit and tunnels, the main horizontal assets, accounted for more than 90 percent of the asset replacement value.

The results for the pilot AMP were organized and calculated using GHD's long-range forecasting model and a customized Excel-based tool. The data to load into the model was exported from the District's MAXIMO, CARA, and ICAM databases. The different data sources were consolidated using the results spreadsheet and analyzed for data errors. The assets were grouped into asset classes, and management strategies were established for each class. The management strategies identified the asset expected life, rehabilitation activities, activity costs, and risk or condition triggers. The cleaned data was imported into the model, where the long-range renewal and financial projections were calculated for the next 100 years.

The pilot AMP included not only the results for the 100-year projection of asset activities and long-range financial plan, but also an analysis of the risks associated with each asset and the current and future service levels the assets must provide. The pilot AMP also assessed the quality of the information used in creating the plan, including any assumptions and specific areas for improvement. The process of creating the pilot AMP was vetted through the creation of this initial plan. The completed pilot AMP became the approved template for the District-wide AMP.

03

Key Staff and Team

→ The Power of Commitment

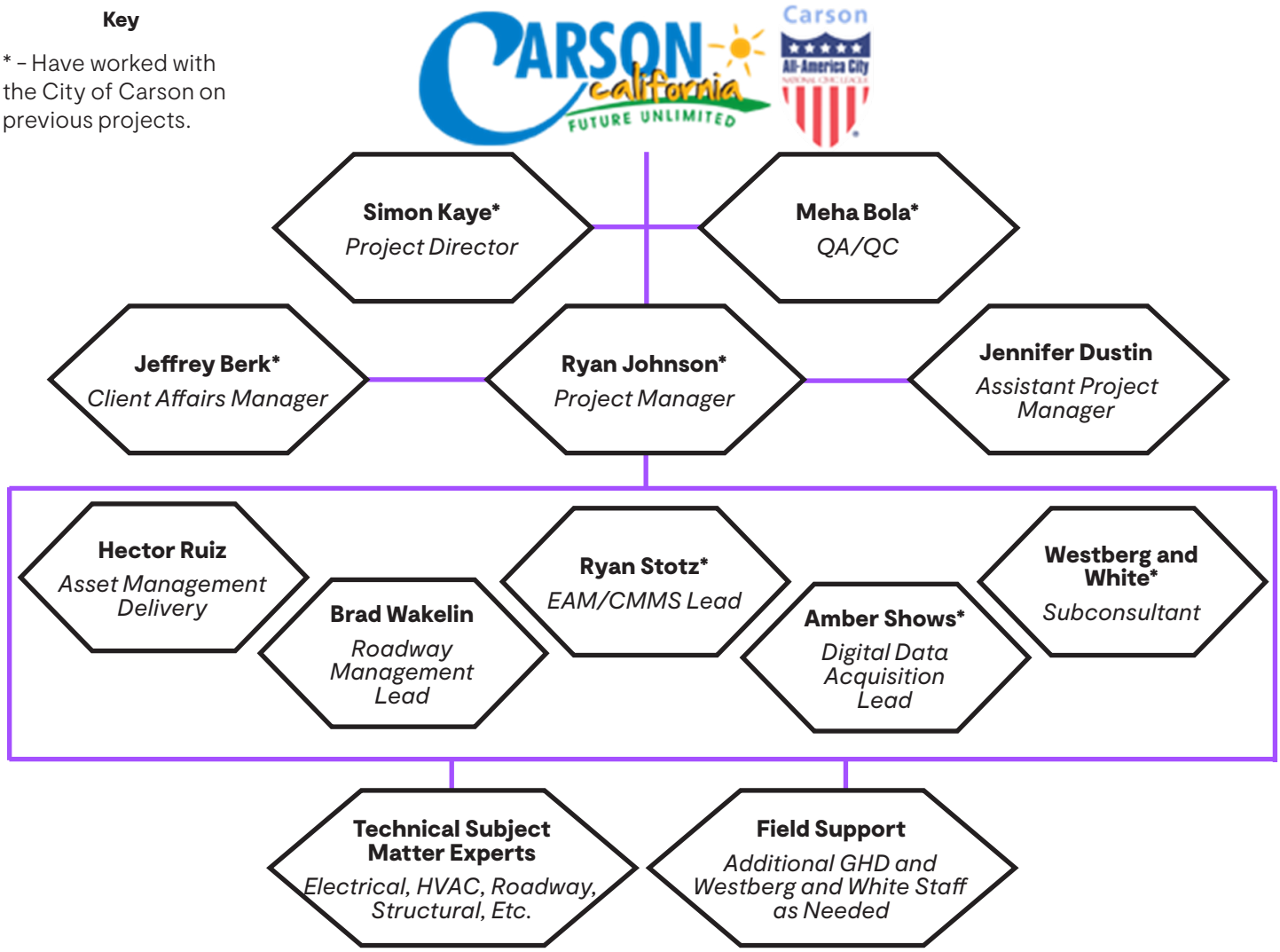
→ Our Team

GHD Team Structure and Members

Based on our understanding of your project needs, we propose a team structure that spans the anticipated needed services. The organizational chart below details our proposed team, including disciplinary-based roles tailored to your project. Many of our team members have worked together on other projects and additional staff may be called on if needed/desired. The key members of this team have worked closely with City of Carson Public Works and Finance Department staff on the prior Facilities Condition Assessment, GIS, and Organizational Needs Analysis projects. The foundation of our project team are the key personnel, all of whom have completed projects for the City of Carson Public Works Dept., knows the City, its needs, operation, and staff. They know how to successfully deliver projects for, and work with the City.

Key

* - Have worked with the City of Carson on previous projects.



In addition to our key team members, GHD brings a depth of staff and resources that cannot be matched. Our Subject Matter Experts in Asset Management, Electrical, Buildings and Facilities, Roadways, and Transportation have demonstrated success in their disciplines across many sectors. These experts are available to support the City in this effort, providing industry leading expertise in the key tasks requested by the City. They will support the immediate GHD and Westberg and White team, and are part of our proposed approach and cost.

Key Personnel

GHD provides the largest capacity and number of resources available. GHD is fully staffed and capable of providing the right services to our clients in a timely fashion. For this contract, we have identified the project team who will serve the City of Carson in the following staffing plan.

We have also provided full, detailed resumes for key staff only in **Appendix A**.

Ryan Johnson
Project Manager

Ryan has more than 15 years of experience providing O&M Management services to both municipal and industrial entities, with a focus on Asset Management and Maintenance Performance optimization. He is uniquely experienced in developing Levels of Service and whole-of-business goals from an Owner/Operator perspective, driving tailored solutions with attainable goals. Ryan is a performance-driven and respected Senior Leader with an emphasis on Optimization, Asset Management Program Development, and Implementation projects. He thrives on driving organizational integrity and maintaining leadership oversight for strategic planning and execution standards, while partnering with clients in defining long-term program initiatives, goals, and objectives.

As Project Manager, Ryan will serve as the primary point-of-contact between GHD and the City. He will be responsible for making sure that the scope of work is delivered to schedule and budget.

Simon Kaye
Project Director

Simon Kaye is a GHD Principal with over more than 25 years of experience providing technical and consulting solutions to clients across the public and private sectors in the UK, Europe, and North America. He specializes in leading strategic consulting engagements focused on asset management, mergers and acquisitions, project turnarounds, and operational efficiency, and asset management to deliver clear project outcomes that are business case backed. Simon is part of the North America Advisory Leadership Team with a specific remit for driving team and delivery performance across all GHD Advisory disciplines.

Simon will support Ryan and the team to make certain that GHD is delivering to expectations. Located near to Carson, Simon will also be available to participate in strategic meetings involving both GHD and the City.

Meha Bola
QA/QC and Organizational Improvement

Meha leads the Organizational Excellence practice on behalf of GHD Advisory, focusing on the human side of strategy, planning, and implementation of technical solutions. Her work on asset management includes transportation, water, and solid waste infrastructure assets and technology assets, and spans the asset lifecycle. She is experienced in strategy and governance, organizational change, business process improvement, and technology selection and implementation for public and private clients across the globe. Meha uses a wide range of skills, including facilitation, training, coaching, management, and mentoring to help organizations meet their most pressing business challenges.

Being intimately familiar with the City's needs and expectations thanks to prior engagements, Meha will be responsible for providing QA/QC of key deliverables. Leveraging her expertise in organizational improvement and change management, Meha will also advise the team and City on all matters related to the human elements associated with any successful AM program.

Jeffrey Berk
Client Affairs Manager

Jeff Berk, with 30 years of experience, is a nationally recognized professional civil engineer dedicated to leadership, strategic planning, project delivery, and committed client relationships. He is responsible for ensuring GHD's corporate commitment for large-scale, multi-disciplined engineering and management projects throughout California. Jeff's management responsibilities include committing the best resources to support client and project goals, including both local staff and global experts. His involvement includes ensuring client expectations are met and that GHD's ISO certified quality management procedures are followed. Jeff Berk has broad experience in infrastructure planning, engineering design, construction, and research. He has helped large agencies address their business and engineering challenges. His professional achievements as a principal-in-charge are reflected in his numerous multi-million-dollar assignments, including projects for the City of Los Angeles Bureau of Sanitation, Los Angeles Department of Water and Power, Orange County Sanitation District, and San Francisco Public Utilities Commission.

Similar to Simon's role, Jeffrey, based on his history supporting the City on other projects, will be available throughout the duration of the project to foster timely, on-budget delivery of the scope that meets or exceeds the City's expectations.

Jennifer Dustin, CAPM
Assistant Project Manager

Jennifer has 15 years of experience in financial, administrative, and project management roles with more than five years focused on asset management in the fields of water, facilities and transportation. Specific experience includes business process mapping, CMMS systems integration, condition assessment, workshop facilitation, and the development of technology solutions to assist and streamline processes and procedures.

Jennifer's primary responsibility for this project will be working closely with Ryan and the team to make sure the scope of work is delivered as promised.

Ryan Stotz
EAM/CMMS Lead

Ryan brings 11 years of experience in geospatial sciences, CMMS implementations and project management. Ryan's background is in GIS and as an Asset Manager working with municipalities to develop and implement effective CMMS and EAM solutions. Ryan supports various projects across North America, focusing on asset management, GIS, CMMS, and reliability. During the past decade, he has worked on projects focused on streets, sidewalks, water, wastewater, incineration, energy production and distribution, and other environmental services.

Ryan has ample experience leading the implementation of EAM/CMMS systems for municipal clients and will reprise that role for the activities prescribed for this project.

Amber Shows
GIS

Amber brings 13 years of experience in geospatial sciences and project management. Her involvement as asset inventory lead on roadway signage, storm drain system, and sewer system projects for municipal clients provides robust background and understanding at the nexus of high accuracy GPS data collection, digital field forms, GIS integration, and preparation for subsequent asset modeling and management.

Amber will lead all of GHD's efforts associated with GIS services, as well as direct the extraction of data from the Mobile LiDAR system.

Brad Wakelin
Roadway Management Lead

Brad has worked with over 40 Public Works Organizations to design, develop, and implement systems for Infrastructure Management. This has included Asset Management for Roads, Water, Wastewater, Sewer, Parks, Facilities, Signs, Bridges, Sidewalks, Trees, Streetlights, Street Furniture, Guardrails, and Signals. The organizations he has worked with include all levels from municipal, provincial, and federal including China and Romania. He has worked with all aspects of implementing systems from start to finish, in teams and independently and is able to successfully discuss implementation details with business and technical teams. Brad has extensive experience with Business Process Review including Asset Management Planning, Business Requirement Documents, Graphical User Interface design, system prototyping, User Acceptance Documentation and testing and database development with Oracle, Microsoft SQL Server, and MS Access.

As a seasoned infrastructure management professional, Brad will manage all GHD tasks associated with Roadway Management.

Hector Ruiz
Asset Management Delivery

Hector Ruiz has more than 30 years of experience in utility management and engineering, including planning, design, construction, and operation of improvements and upgrades to water/wastewater/storm water systems. Hector's experience with utility management includes working side-by-side with engineering, planning, legal counsel, finance, maintenance, and operations personnel on business workflows and process mapping, conducting gap assessments, implementing Computerized Maintenance Management Systems (CMMS), developing condition assessment protocols, developing Asset Management (AM) plans, developing short-term and long-term investment profiles, and conducting business case evaluations.

Leveraging his years of experience implementing similar AM programs for other municipalities, Hector's focus on this project will be to provide the team with best practices and standard operating procedures associated with successful AM program implementation.

Subconsultant

To strategically augment the strength and efficiency of our team, GHD will be joined by Westberg and White. We have long-term relationships with Westberg and White, and the staff on this team. They bring the most appropriate resources for the defined scope of work, possess a uniquely qualified staff and are committed to the success of this project. Westberg and White will be focusing on building and facilities assessments, ADA compliance needs, and risk reduction design analysis for this project.

Westberg and White

At Westberg and White, we strive for our architectural practice to continually be on the pioneering edge of creativity, stimulation, and service to effectively delight our public clients and the individuals who are the ultimate users of our designs. Our services include architectural and landscape design; structural, mechanical, electrical, and civil engineering; cost estimating; and any required energy studies. As part of these services, we also assist clients in administering the bidding process; in selecting supplemental staff, such as inspectors; and in managing the construction process, including regular site visits during construction.

westbergwhite architecture

Continuity of Personnel

We are committed to keeping the same project team we are proposing. Should an unexpected change result in a team member being unavailable to serve the City on this project, we are backed with the resources of a global network. No changes will be made to the project team without consent by the City of Carson.

04

Project Understanding

→ The Power of Commitment

→ Project Understanding

GHD possesses unparalleled understanding of the complex nature of this project and all the elements required to make it a success. Further, we offer a deep understanding of the City's vision, mission and strategy. Our team's experience supporting the City on prior successful endeavors, combined with our unique understanding of your staff and assets, will foster a strong partnership between our two entities and result in the best possible outcomes for this Asset Management Program.

We have tailored our approach to develop and implement an asset management program that fits those needs, fosters realistic achievement of those goals, brings the best value, and is the right solution for the City. GHD views the ultimate goals of the development and implementation of a sound AM program as made up of three key parts:

1. Provide the Division Leads, Public Works Director and City Leadership with the knowledge of its assets to make better decisions (e.g., allocating financial and staffing resources to maximize its level of service to the community and minimize risk).
2. Identify where to focus its resources by first identifying risk and then developing sound maintenance and capital replacement strategies to mitigate those risks.
3. Develop effective maintenance planning, scheduling, and recording of activities to streamline public works efforts, thus improving their effectiveness and helping build an overarching asset management culture.

Thanks to our unique understanding of the City's assets and staff, GHD has no learning curve and is prepared to mobilize on Day One.

Key to development of the Asset Management Program is that it aligns with the City's Strategic Business Plan; and that it lives within the City's Mission, Vision, and Strategy.

The City of Carson has a significant amount of assets included in this effort. GHD will focus our evaluation and efforts on the City's Roadways (all applicable sub-systems), Parks, Buildings/ Facilities, and Right-of-Way assets.

GHD believes the best way to bring the five main tasks prescribed by the City to an effective program is to develop a Strategic Asset Management Plan (SAMP). This SAMP encompasses all the tasks and deliverables requested by the City, while also providing a foundation for the deployment and sustainability of an asset management program. Providing more than just the outputs (deliverables) from each task, this SAMP will tie them all together, providing guidance, governance, protocols and strategy, thus facilitating growth and success of an asset management program for the City of Carson. This is the difference between an asset management program that thrives, grows and effects demonstrable results, rather than simply having a handful of disconnected technical memorandums that ultimately die on the desk.

To bring the maximum value to the City, GHD is proposing to perform key tasks concurrently in order to maximize efficiency, achieve the greatest amount of progress in the shortest period of time (satisfy the desired schedule), and create replicable protocols for the City going forward. This will enable the City to progress its asset management program and ultimately become self-sufficient.

Activities such as the Asset inventory/validation, data gathering, and condition assessments will be done side-by-side, where applicable, to maximize effort. All efforts will be taken to streamline and make the process as efficient as possible, without sacrificing quality or achievement of the project goals.

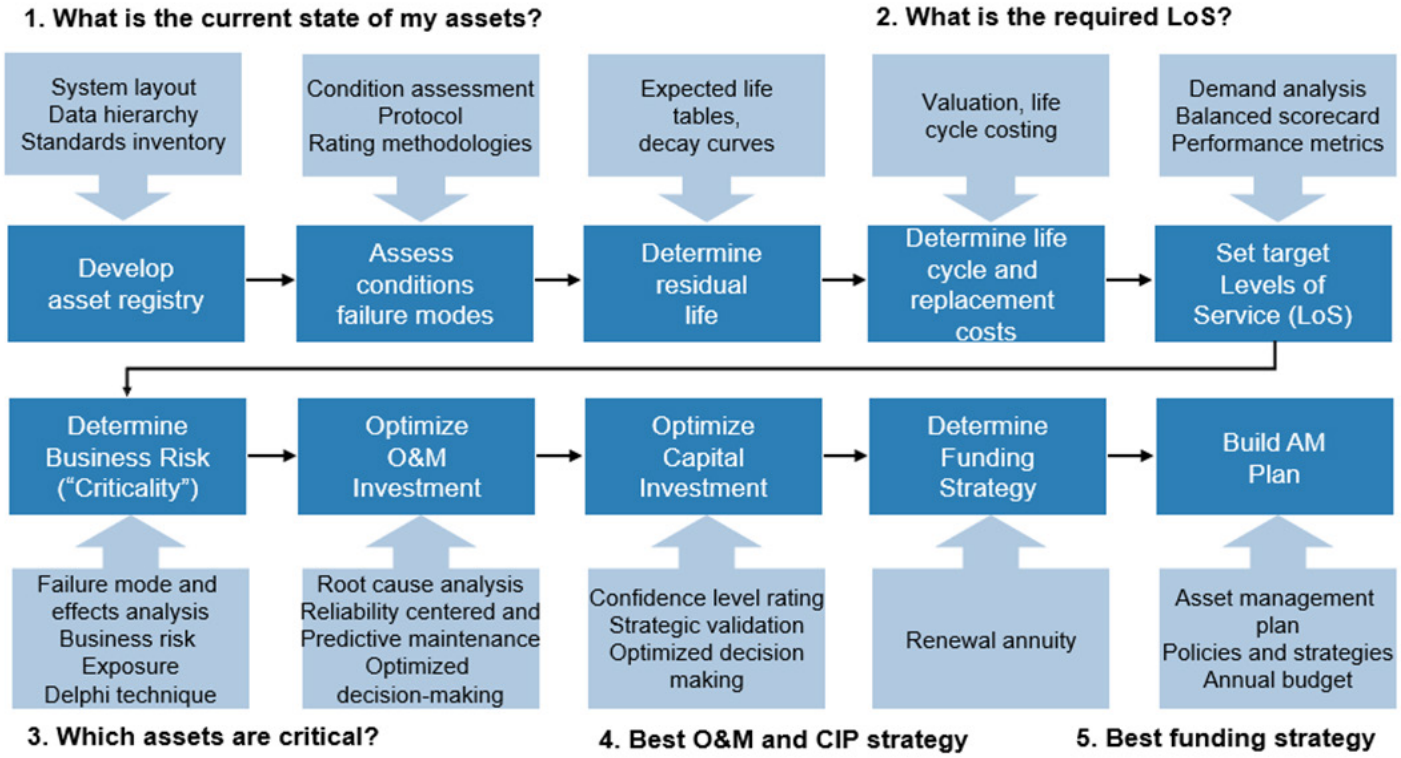
Project Goals

The Development of the Asset Management Program is envisioned to position the City to achieve the following project goals, and will follow the approach diagrammed below:

1. Understand the current state of the City's infrastructure and its future needs.
2. Provide asset management and asset lifecycle profiles to influence decisions intended to optimize reinvestment and stewardship of city infrastructure to meet service expectations.
3. Utilize CMMS/EAM technology to identify, inventory and track the assets, schedule plan, and execute the appropriate

maintenance, rehabilitation, and replacement needs and provide accurate information to make informed decisions with available resources.

4. Understand the probability and consequence of failure of each asset class so that the City can manage high risk assets before failure and minimize the City's overall risk profile.
5. Minimize the life-cycle cost by incorporating the latest technological advances in infrastructure to develop efficient and effective preservation and restoration strategies as well as monitoring strategies.
6. Develop a consistent and defend-able methodology for prioritizing work and budget expenditures by directly linking strategic asset management to strategic financial planning.
7. Focus on high benefit-to-cost ratio to ensure the budget is spent in the right place, for the right reason, at the right time, at the right cost.
8. Create transparency through easily understood visualizations and information to ensure an alignment of asset management procedures and needs.



GHD utilizes our extensive experience and library of processes and tools to guide the foundational elements of the proposed framework, such as condition assessment, estimating remaining useful life, criticality, and risk-based prioritization of assets. GHD will also work with the City to evaluate and select an effective CMMS/EAM system, configuring CMMS business rules, workflows, and data quality standards to effectively support asset management strategies.

These processes and tools can be applied to all asset types across all the City's systems. GHD Focuses on 'right-sized, fit-for-purpose' solutions. The practice of asset management reaches across all functions of an organization, from operations and maintenance to finance and administration, and everything in between. Each organization is different and successful asset management programs are not 'cookie cutter' initiatives. Our team focuses on bringing leading practices in the industry, and sizing and implementing them in ways that fit the specific requests and context of the City. Because no two organizations are exactly alike, our approach does not replicate past projects, but instead incorporates our team's experience to meet the specific needs and goals of the City of Carson.

05

Project Approach, Work Plan

→ The Power of Commitment

→ Project Approach and Work Plan

Approach

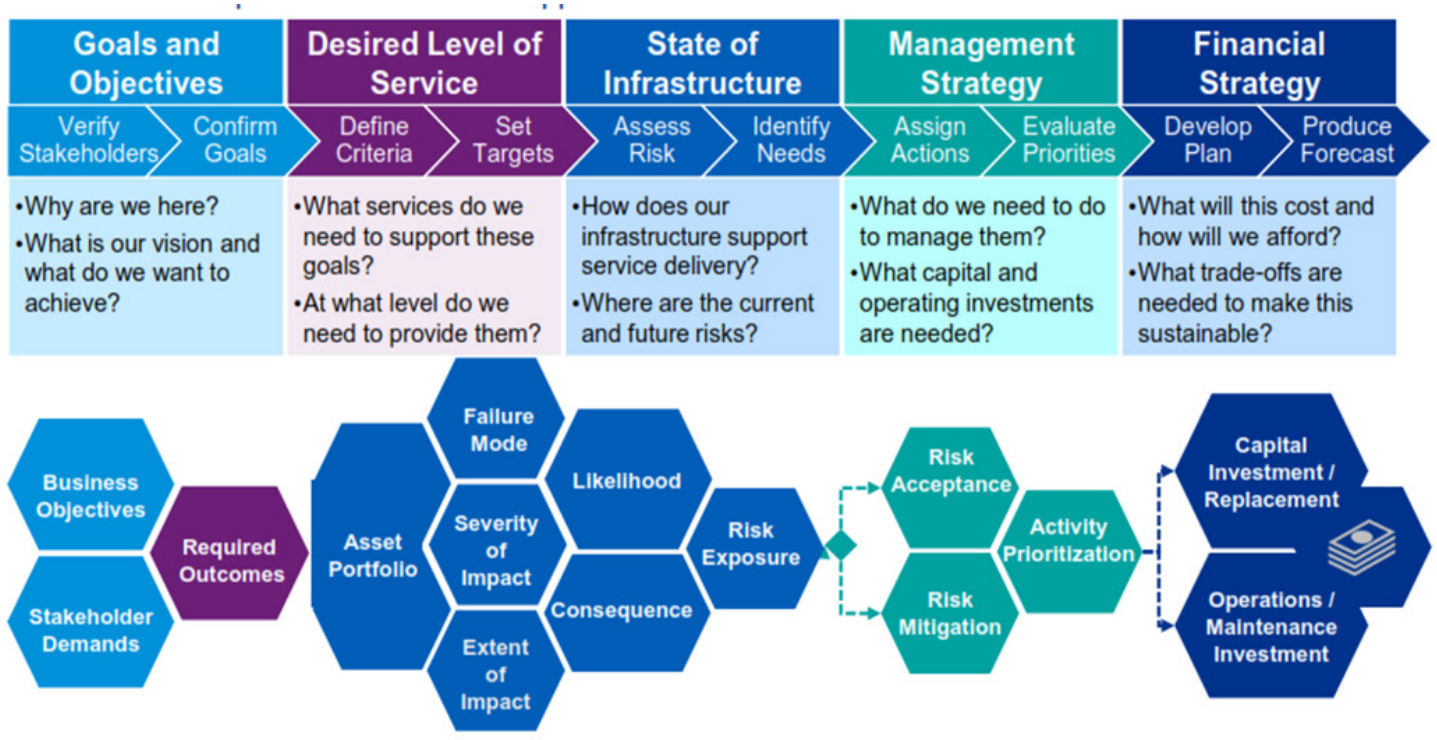
GHD proposes to address the specific project goals for the Asset Management Program Project with the following work plan utilizing our unique and comprehensive approach detailed in this Section. The work plan is organized to be flexible, allowing us to approach the project in the best way possible.

GHD has proven approaches for streamlining the development of the Strategic Asset Management Plan, a critical first-step to establishing a successful AM Program.

To increase efficiencies and bring value, GHD is recommending performing tasks that can be done effectively at the same time. For example, personnel that are performing the Asset Categorization/ Inventory Assessment can also conduct Condition Assessments on those assets while they are there. By eliminating re-mobilization, and collecting as much useful data as possible to increase accuracy and decrease the need to close gaps found later in the development process, GHD is effectively streamlining the process of developing the SAMP. A major part to achieving this is leveraging state-of-the-art technologies like the mobile LiDAR approach for collecting Roadway and Right-of-Way assets and information. This will expedite the process and provide the City with a repository of data to use in this(and future) efforts without the need or cost to re-mobilize or re-collect the data.

Understanding the needs and efforts required to accomplish these goals, GHD has established a Work Plan that has proven highly effective on similar endeavors conducted for other municipal agencies. The activities described below, along with the estimated hours and scheduled duration, apply to conducting these tasks across all systems, within the time frame requested by the City. Please note though; these activities can be separated out if desired.

GHD has also highlighted tasks that were not prescribed in the RFP, but based on our ample experience, are necessary to achieve the City's AMP goals, and bring the maximum value to the City. These tasks will leverage all the work done in this project scope and enhance the City's Asset Management Program.



Work Plan

Task 1: Asset Categorization

GHD will perform an Asset Inventory Assessment to capture the location, size, type, materials, condition, and environmental features for various asset systems, including: buildings; parks; roadways; public landscaping; and identified right-of-way assets. This will be a holistic inventory and serve as the foundation for the Asset Inventory and hierarchy in the CMMS/EAM.

A systematic and consistent protocol for collecting and categorizing assets will be developed along with a standardized hierarchy to ensure consistency of asset inventory and categorizing going forward.

GHD will work with the City to identify asset classes, types and develop the parent-child based hierarchy. Our approach, specifically for the Roadways, will be to effectively capture as much data as possible using our proposed Mobile LiDAR technology. This will provide an immediate cost savings and provide significant savings over time should the City need to incorporate asset data not used in this scope of work for future projects.

A citywide inventory and assessment of publicly owned and maintained assets and facilities will be conducted to develop a complete and accurate Asset Register. GHD will record the asset, capture attributes (e.g., type, size, material), record location (GPS coordinates), and take a picture of the asset. The development of the Asset Register will consist of the steps/activities identified hereafter.

1.1: Existing Information Review and Asset Data Collection/Inventory

GHD will review such information as existing GIS data, spreadsheets, logs, records, Maintenance Management plans, gap/benchmarking assessments and other relevant documents. GHD will create understanding of content and formatting of the plans to foster accuracy of existing data and gaps.

Assumptions:
The City, having prepared for this project, will be able to easily direct GHD staff to all relevant information.

1.1.1: Data Sourcing and Asset Register Prep

GHD will become familiar with and begin data acquisition from appropriate data sources, including the key primary sources:

- Existing asset inventory and data
- GIS
- Asset Records, spreadsheets, and staff interviews

Once gathered, GHD will begin building the Asset Inventory, categorization and preparing for data entry and analysis.

Deliverables:
4-hour workshop to gather and review data and documents

1.1.2: Citywide Asset Inventory

The inventory of the identified and selected "Qualifying Assets" will be conducted, with a validation of recorded existing assets, and collection of unrecorded assets completed. Newly identified/recorded assets and associated data will be compiled for evaluation and approval by the City.

GHD will approach the asset inventories by class groups developed with the City of Carson: Buildings, Parks, Roadways, and Right-of-Way asset classes. All but the Roadways and Right-of-Way class groups will be inventoried manually with a team of two field staff using mobile tablets and where appropriate sub-meter GPS receivers. Manual field inventories will include addition or verification of asset attributes, condition assessment, and photo capture.

Due to the density of associated assets, roadways and Right-of-Way will be inventoried using a vehicle mounted 32-beam mobile scanning LiDAR device. The LiDAR point cloud will then be post-processed using TopoDOT software to extract features manually and automatically into vector format including striping, signage, sidewalks, curb ramps, curb and gutter, streetlights, and traffic lights at a minimum and will be available for additional feature extraction in the future, if and when needed (street furniture, transit facilities, etc.).

To address Roadway and Right-of-Way asset condition assessment, a 360-degree camera will be deployed concurrently with LiDAR capture. This imagery will assist in condition assessment, and it will provide the photo capture required as part of the asset inventory. TopoDOT software can also be used to inform asset condition assessment through slope calculations on sidewalks and curb ramps and reflectance measured from striping and signage. Where these measurements meet condition assessment criteria, they may be used to inform the condition assessment report.

Deliverables:
4-hour Asset Definition Workshop, including workshop presentation and summary list of existing assets

1.1.3: Asset Inventory Comparison

Newly identified/captured assets will be compared to existing assets in the database. This assessment will identify gaps between existing system asset records and field validated records. These gaps will be evaluated and recommendations for closing/adding assets will be made to the City. The newly identified assets will be added to the Asset Register in order to represent a complete and detailed inventory of all the qualifying assets.

1.1.4: Data Collection and Management

The current processes for data collection will be reviewed by GHD. The AMP will describe the business practices and relationships between the applications used, and the process and method for using the data collected to make operational and management decisions.

1.2: Asset Register Development (Asset Definition)

1.2.1: Asset Register Creation, Identification

GHD will assess and compile an inventory of "Qualifying City-wide assets". These assets will be identified through a workshop with City of Carson staff and be evaluated through an interview process to meet the criteria established, based on level of service goals. Key elements of this evaluation will be the assets criticality, present and replacement costs, and other criteria selected by the stakeholders. Once the assets are identified for inclusion, the key informational data points of these assets will be organized and validated to include at a minimum:

- Asset Description
- Asset ID
- Treatment process associated with the asset
- Physical attributes
- Manufacturer data (Manufacturer, Model, Serial)
- Nameplate data (where applicable)

Deliverables:
Two 4-hour workshops to develop asset definitions, and information/data collection standards.

1.2.2: Asset Hierarchy

The developed Asset Register and Hierarchy schema will clearly define and present the parent-child relationship between

all qualifying assets of the City-wide systems. This will be presented in a clear, graphical flow representation and follow the City's established standards and protocol. GHD will establish a location-based, function-centric hierarchy for all Systems and Assets. It will be easily searchable, logically cascaded from parent to child, and allow visibility into the specific assets, as well as being able to roll cumulative data up to the Parent units (Cost, time, etc.).

The deliverable resulting from this sub-task will be a Technical Memorandum summarizing the asset inventory/listing of assets and application of asset definitions.

The Asset Register is envisioned to logically organize various families of assets. GHD will conduct workshops with staff to develop the following components within the Asset Register:

- Incorporate Asset Hierarchy that organizes assets logically based on the different assets maintained by the City including the determination of criteria for critical assets.
- Develop Asset Classes to more efficiently model and manage assets. An Asset Class refers to a group of assets that behave similarly. The assets should be further categorized based on material or the type of asset classes. (E.g., roadways, traffic signal systems, etc.)

Deliverables:
4-hours Asset Hierarchy Creation Workshop
Draft TM Summarizing Various Subtasks for Asset Categorization

Task 2: Risk Prioritization Plan

2.1: Existing Condition Assessment Review

GHD will conduct a workshop with City of Carson Staff to collect and review existing condition assessment data, reports, and relevant experiential data. In coordination with Carson staff, and using GHD's Asset Management Standards, GHD will create a standard criterion for Condition Assessments. The Condition Assessment Strategy for the City-wide assets is based on GHD's approach to determining risk, industry standards for assessing and scoring condition of assets. The primary failure mode initially considered when determining an asset's probability of failure (POF) is physical mortality. Therefore, it is critical to evaluate and/or estimate the physical condition of assets. Buried assets are mostly passive assets (no moving parts) and can serve their intended design functions for many decades unless there are underlying issues such as manufacturing defects, design deficiencies or installation problems not caught and corrected during construction management activities. Facility or vertical assets (e.g., pump stations) are divided into one of the four categories of asset type: mechanical, electrical, instrumentation or structural. Each type of asset has a unique decay pattern and curve shape. The condition rating score of 1 to 5 will be used to assess the condition of an asset along with the description of each score.

Deliverables:
4-hours Existing Condition Assessments Review and Condition Assessment Criteria Development Workshop

2.2: Condition Assessment Database

GHD will create a workflow, form, and database solution to input the condition assessment data and results. This solution shall be non-proprietary and shall easily be updatable during future condition assessments. This solution shall also be maintainable by the City of Carson and replicable for other facilities. GHD are very experienced through many years of asset data collection, verification, and condition assessment. We understand the cost implications of collecting large data sets and the need to have and maintain data integrity. GHD's Assist tool is prepositioned to address the systems and asset types of the City of Carson, and minimal configuration time is needed to set up- bringing value to the City.

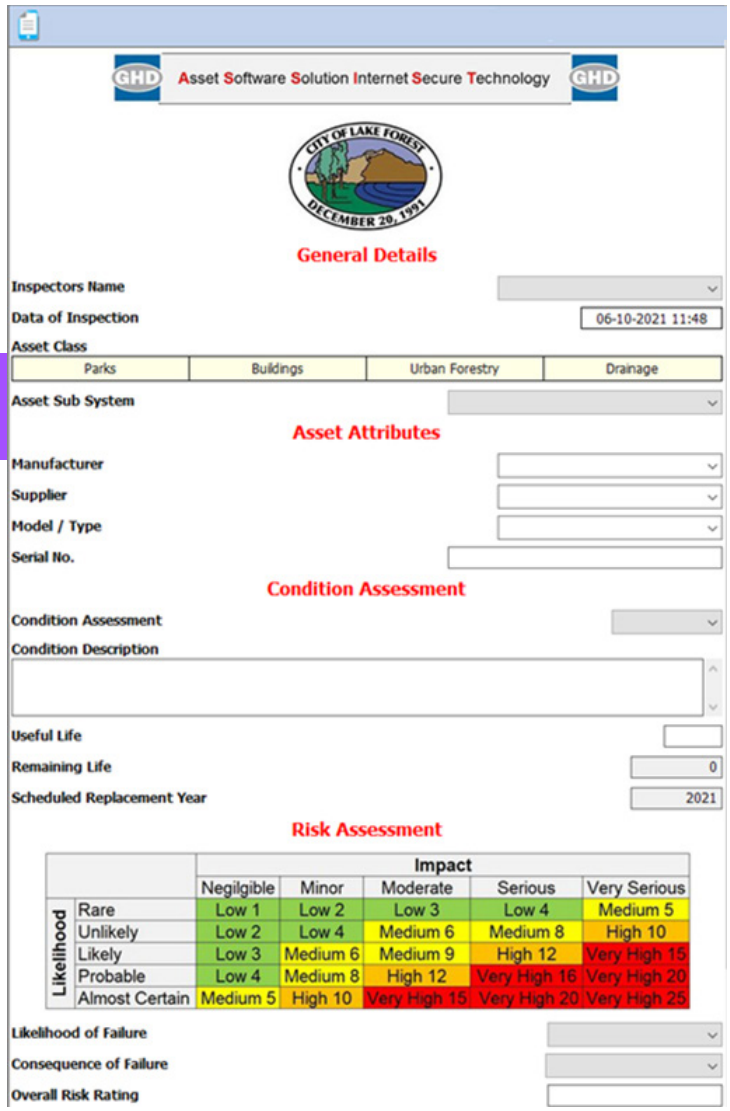
To that end, GHD proposes to utilize our ASSIST data collection tools which will provide the efficiencies required and the integrity desired. We have used ASSIST on well over 1,700 projects around the globe and will bring all the learnings we have to your project.

ASSIST will allow us to customize templates to cover all your asset classes and the variety of asset attributes required for

each class. The ability to take and auto link photographs is a feature of ASSIST. The data can be downloaded as a spreadsheet allowing upload into enterprise systems if required and can also integrate with GIS systems.

Irrespective of who collects the data, how many are collecting data or which location is being inspected, ASSIST creates a single source of data truth.

In addition to the collection of data, we can auto populate agreed reporting formats to provide additional efficiencies.



Assumptions:
20 Hours of ASSIST system prep.

2.3: Risk Analysis

For all the Citywide Qualifying Assets, the primary or predominant failure modes associated with that specific asset, in its specific operating context, will be identified and evaluated. This Failure Mode and Effects Analysis (FMEA) will be essential in prescribing the appropriate maintenance to the assets, understanding the assets criticality, and implementing an effective asset management program. Probability of failure of an asset is directly related to its failure mode. The probability of physical breakdown and the probability of capacity reduction for a particular asset may not be similar. An important component of asset management is to identify and manage the **imminent and dominant failure modes** of an individual asset. From an asset management perspective, assets can fail in one of four ways:

- *Physical Mortality* – occurs when an asset is no longer useful due to physical failure (e.g., pipe wall collapse). Condition is a primary indicator for physical mortality failure
- *Capacity* – occurs when an asset, regardless of its physical condition, fails to meet the capacity required by the demands of customers, processes, or systems
- *Level of Service* – occurs when an asset fails to meet the service level established for that asset
- *Financial Efficiency* – occurs when there is a lower cost alternative replacement option to operating and maintaining an asset (i.e., high life cycle cost)

The **dominant failure mode** for an asset is the failure mode that results in the greatest consequence of failure. Generally, the dominant failure mode is physical mortality.

Deliverables:
4-hours Level of Service Definition Creation Workshop (Risk)

2.3.1: Probability of Failure

Asset Probability of Failure, or Likelihood of Failure, is a function of remaining service life and is correlated to the asset's

physical condition and other performance considerations such as the asset's ability to meet its required demand (e.g., whether the capacity of a reach of gravity sanitary sewer can meet the hydraulic demand).

GHD will use a Probability of Failure (POF) analysis, with a 1 to 5 rating, and based on remaining useful life and other factors to assign a POF score to qualifying assets. This score will represent the likelihood, or probability of the asset failing, due to its operating demands, environment, deterioration mechanisms present, predominant failure modes and condition.

Likelihood of Failure / Community Center HVAC Example

Category	Wt.	Negligible = 1	Unlikely = 3	Possible = 5	Likely = 7	Very Likely = 10
Physical Condition	60 %	Very Good. Condition Grade 1. New Or Nearly New. Only Normal Maintenance Required.	Good. Condition Grade 2. Minor Wear.	Fair. Condition Grade 3 Major Wear Impacting Level Of Service.	Poor. Condition Grade 4. Unable To Meet Level Of Service Life. Failure Imminent.	Very Poor. Grade 5. Requires Complete Rehabilitation Or Replacement. Failed.
O&M Protocols	20 %	Complete accurate, Up-To-Date, Written, Easily Accessible And Is Being Used.	Complete, Written, Up To-Date, Being Used but not easily accessible	Partially Developed	Written, But Out-Date And Not Used	No Written Protocols
Perform-ance	10 %	Sufficient capacity to meet average and peak usage demand. Appropriate utilization and function.	Under-utilized or oversized.	Sufficient capacity, but does not meet functional requirements, or over utilized.	Able to meet current average capacity demand, but not peak demands.	Unable to meet current average capacity needs.
Reliability	10 %	No Unscheduled corrective work order events or failures within 12 months	1 unscheduled corrective work order events within 12 months, failure in last 12 months	2 unscheduled corrective work order events within 12 months, 2 failures in last 12 months	3 unscheduled corrective work order events within 12 months, multiple failures	4 unscheduled corrective work order events within 12 months, catastrophic failure

20 Facilities and Maintenance Analysis Project Presentation WWA and GHD

Deliverables:
4-hour POF Assessment Criteria and Ratings Development Workshop
2, 4-hour POF Asset Evaluation and Scoring Workshops

2.3.2: Consequence of Failure

Consequence of Failure (COF) is often referred to as "criticality", and these terms (COF and criticality) are frequently used interchangeably. Asset COF is evaluated based on estimating the social, financial, and environmental/regulatory impacts of an asset failure. These three broad categories of consequence of failure are often referred to as the Triple Bottom Line (TBL) and go beyond simply assessing the direct financial consequences of an asset's failure (e.g. cost to repair or resource impacts). Working with the City of Carson, GHD will develop a consequence of failure scoring matrix based on our experience with similar water and wastewater utilities. As no two organizations are alike, the COF scoring system will be customized for the City. GHD will incorporate any existing preferences for scoring and/or weightings of the TBL categories currently used by the City of Carson.

Consequence of Failure / Community Center HVAC Example

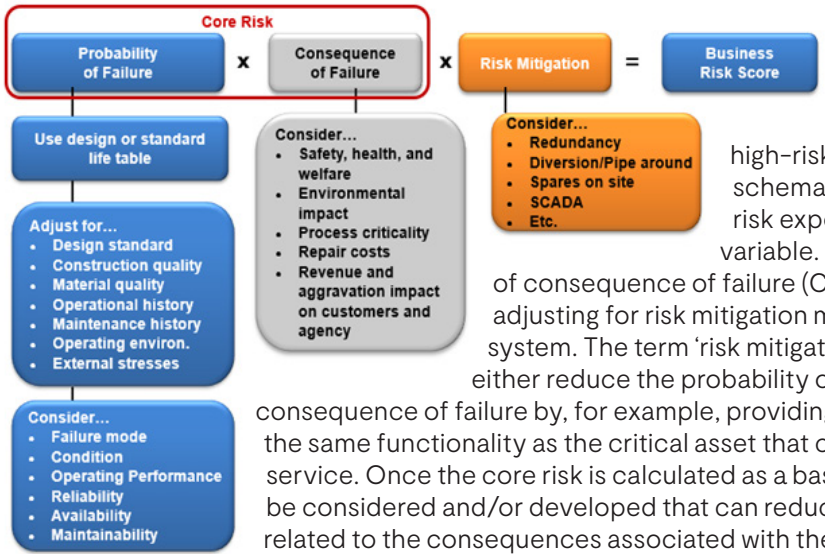
Category	Wt.	Negligible = 1	Low = 4	Moderate = 7	Severe = 10
Public Confidence	25%	No social or economic impact on the community. No reactive media coverage. Any media coverage is a result of proactive announcements by Utility. No complaints.	Minor disruption (e.g., traffic, dust, noise). No adverse media coverage. Some targeted community complaints	Substantial but short-term disruption. Adverse media coverage due to public impact. Localized media coverage. Moderate community complaints	Long-term impact. Area-wide disruption. Regional media coverage. High volume of community complaints
Safety of Public and Employees	25%	No Injuries Or Adverse Health Effects	No Lost-Time Injuries Or Medical Attention Required beyond first aid	Lost-Time Injury Or Medical Attention Required	Loss Of Life Or Widespread Outbreak Of Illness
Regulatory Compliance	20%	No State or County permit violations	Technical violation	Probable enforcement action, but fines or surcharge unlikely	Regulator Consent order, violations, lawsuits
System Delivery	20%	No impact	Minor impact to process or out of service less than 4 hours.	Major impact to process, out of service >8 hours.	Major impact to process, out of service >24 hours.
Financial Impact	10%	Can be repaired within Annual budgeted repairs limit budget and under $5K	Can be repaired within annual budgeted repair limit budget and exceeds $5k (3 bids)	Cannot be repaired within annual repairs budget and exceeds $5K (emergency, City Manager Approval)	Greater than $25k (City Manager/Council Approval

Facilities and Maintenance Analysis Project Presentation WWA and GHD

GHD will Assign a 1 to 5 consequence of failure (COF) ranking to all qualifying assets. This evaluation will assess the biggest consequence of failure associated with the specific failure mode identified. The collateral effects on other downstream equipment's/assets, impacts to the LOS definitions, impact on ability to mitigate (lead times on spares, etc.) and be the basis of the Business Risk Exposure.

Deliverables:
4-hour COF Assessment Criteria and Ratings Development Workshop
2, 4-hour COF Asset Evaluation and Scoring Workshops

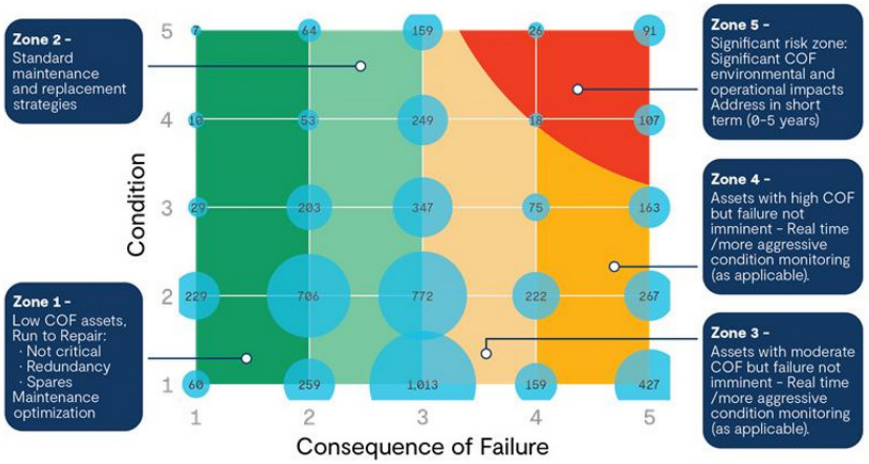
2.3.3: Business Risk Exposure Identification



GHD's Business Risk Exposure (BRE) method provides a set of rules for determining the direct and indirect consequences of the failure of an asset and helps management teams focus on high-risk assets and related issues. The figure to the left is a schematic representation of the key variables of business risk exposure with components that contribute to each variable. The term "core risk" is defined as the product of consequence of failure (COF) and the probability of failure (POF) without adjusting for risk mitigation measures that may be in place for the asset or system. The term 'risk mitigation' refers to those practices applied to an asset to either reduce the probability of failure (by adding "resistance" to the asset) or the consequence of failure by, for example, providing a parallel asset/process (e.g., redundancy) with the same functionality as the critical asset that can be used should the critical asset fail or be out of service. Once the core risk is calculated as a baseline measurement, risk mitigation strategies can be considered and/or developed that can reduce the level of risk. Business risk exposure is closely related to the consequences associated with the total loss or failure of the asset. It is noteworthy that critical assets may be in good condition and therefore unlikely to fail in the immediate future, but the asset remains critical to the provision of services.

Utilizing GHD's risk and BRE analysis, GHD will prepare a Risk Analysis report to help the City understand the potential level of risks associated with citywide assets.

The objective of this process is to prepare a Risk Prioritization Plan that summarizes the various subtasks addressing POF, COF, and mitigation factors and presents the methodology for determining an asset or facility's risk and priority for renewal. GHD's risk prioritization methodology to assigning risk criteria for asset replacement is based on assigning assets or facilities to risk management zones. Risk management zones and recommended strategies for each zone are illustrated to the right.



The risk management zone establishes the initial prioritization consideration (prioritization 'bucket') for asset operations & maintenance (O&M) and capital investment needs. Additional prioritization of asset interventions within individual risk management zones is accomplished by establishing priorities within zones based on asset consequence of failure and condition. The investment profile development and comparisons of scenarios with differing risk intervention triggers (for asset renewal investments) are performed with the help of a Decision Support Tool (DST). GHD has developed and used multiple tools in the past (with varying sophistication) to support the development of investment profiles.

Deliverables:
Probability of Failure (POF) and Consequence of Failure (COF) scoring table for each system reviewed
Draft Risk Analysis Report
Draft Risk Prioritization Plan

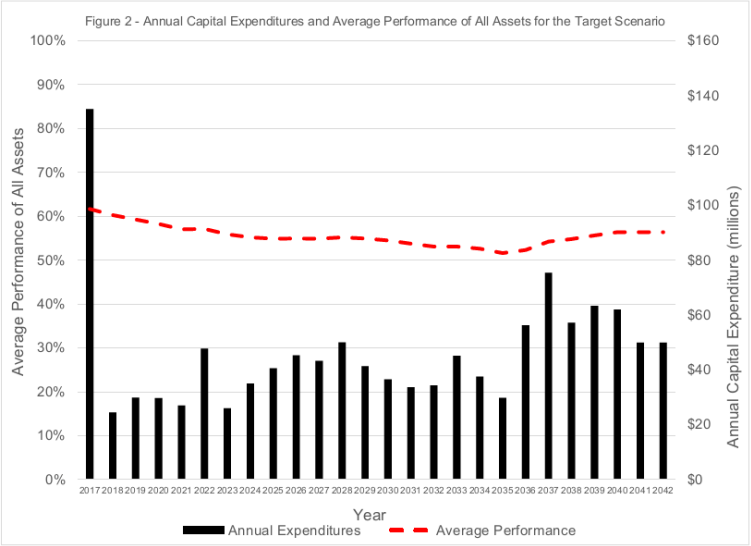
Task 3: Development of Capital Replacement Budget

GHD will Develop a 5-year Capital Improvement Plan (CIP) that encompasses three planning horizons of 10, 25 and 50 years. The 5-year CIP will consist of specific project recommendations focusing initially on the highest priority assets and facilities, with further refinement considering projects and assets already included in the current CIP.

The CIP will be focused on reduction of risk, and the most effective investments to facilitate not only the immediate and subsequent risk reductions but sustaining the assets throughout their entire life-cycle. Replacement and investment intervals will be predicated on appropriate maintenance strategies, context of use of the assets, and the most cost-effective means to preserve the assets function. The proposed CIP list of projects will be validated with City Staff, compared against historical failures and issues, and verified to ensure the projects picked will be the most effective for the City's investments.

A key part in the development of the City of Carson's asset management program, is determining what the best mix of capital and O&M strategies that are financially sustainable and meet performance requirements. To effectively make these decisions, an estimated replacement value (ERV) for qualifying assets must be developed. This ERV facilitates the key activities below:

- Periodic rehabilitation schedule information – If an asset can be rehabilitated (and it is feasible to do so), the asset register identifies how many times it can be rehabilitated before it must be replaced, including what the estimated resulting condition score will be after each rehabilitation, based on that asset's assigned Asset Class. This assists in determining the timing of future investments and estimating the Maximum Potential Life (MPL) of the asset as part of the forecasted estimated investment needs modeling.
- Physical Effective Lives (PEL) - The PEL is the life of the asset through physical decay and routine maintenance without any major intervention (e.g., rehabilitation). PELs are assigned to each asset according to Asset Class.



- Estimated rehabilitation dates and estimated rehabilitation replacement costs based on the forecast modeling
- Estimated replacement dates and estimated future life cycle costs based on the forecast modeling of capital and O&M
- Asset criticality (consequence of failure) score

Information stored in the asset register will be used for analyses that result in key outputs to inform the capital and O&M investment planning process, including calculating the asset risk management zone used for capital and O&M prioritization.

The asset register will be used in the base scenario to identify potential risks, and life cycle cost (LCC) over a planning horizon. Assets in the asset register will be assigned an asset class (also known as a Management Strategy Group, or MSG) which form the basis of assigning key variables that are used in the LCC analysis and determine intervention strategies.

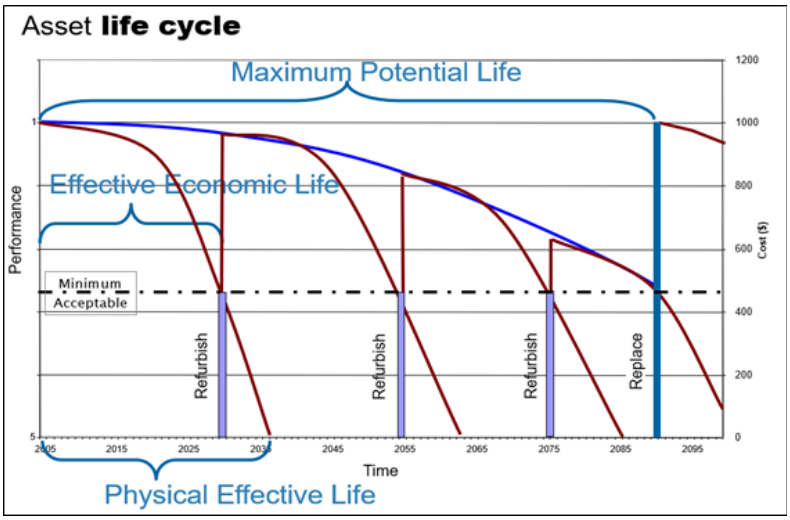
The investment profile development and comparisons of scenarios with differing risk intervention triggers (for asset renewal investments) are performed with the help of a Decision Support Tool (DST). GHD has developed multiple tools in the past (with varying sophistication) to support the development of investment profiles. There are also many commercially available tools that are available as DST for asset management.

The results of the investment profile of the selected strategy are then further reviewed and "bundled" into projects (e.g. sewer replacement project) or programs (valve replacement program). Prioritization is accomplished using the process described previously and through other AM decision making process using business case evaluations.

3.1: Remaining Useful Life (RUL)

Using the condition evaluations gathered, GHD will assign an estimated Remaining Useful Life (RUL) to qualifying assets.

This RUL estimation will be based on the qualifying asset's ability to perform its desired function in its operating context, observed deterioration mechanisms and conditions that affect its function, and its current physical condition. This analysis will be fundamental to determining the Business Risk Exposure of the assets.



Understanding the imminent failure mode of an asset allows an organization to apply the appropriate strategy option to maximize the service benefit per cost spent. Each failure mode, where appropriate, has a time period associated with it. For example, an asset could have 20 years remaining before physical failure, five years before level of service failure, and 10 years before financial failure, but two years remaining before capacity failure. In this scenario, the remaining useful life of the asset would be two years, and the appropriate strategy might be to increase the capacity of the asset through redesign.

3.2: Capital Planning, Replacement Strategy

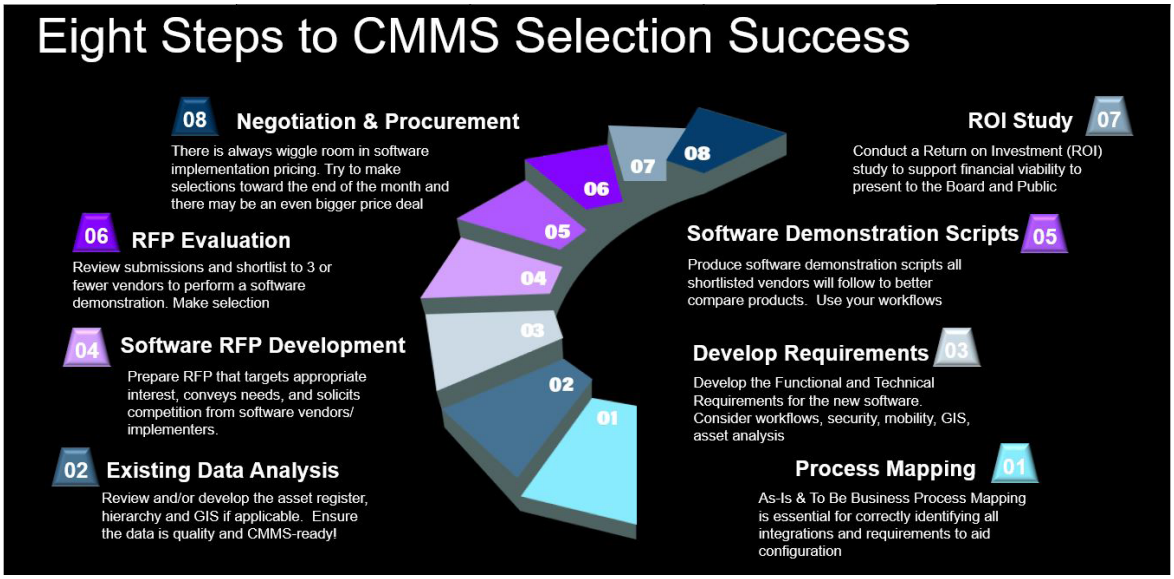
Using the Risk Analysis along with the identified level of service, remaining useful life evaluations (RUL) and Estimated Replacement Value (ERV) analysis, GHD will develop and rank the City's needs for replacement and rehabilitation for each Asset Class over the next five years.

Deliverables:
4-hour Prioritization Criteria for Capital Replacement Development Workshop
4-hour Capital Improvement Project Budgeting Workshop

Task 4: CMMS Software Evaluation

4.1: CMMS Selection

To leverage the City's developed Asset Management Program, a robust and effective Computerized Maintenance Management System (CMMS) is key. This enables the City to house its asset inventory(register), all the asset's information, its condition and risk, and effectively plan and schedule maintenance against them. It serves as the central repository for key information about the assets, the history of maintenance, replacement, refurbishment, and costs associated with the assets, and enables the City to make more informed, data driven decisions. It also enables the effective identification, planning and scheduling for all needed maintenance activities, and control/improve maintenance performance. GHD is intimately familiar with all CMMS products and vendors. We will help



you identify the right solutions, that meets the present and future needs of the City. We will configure and implement the desired solution, integrating with other enterprise systems (GIS, Finance, etc.), configuring the appropriate workflows, data schema, work request and work order development, and train necessary staff. Primary considerations to be evaluated will be predicated on:

Ease of use for line staff to report their completed task.

Ease of Scheduling of assignments from Supervisors, Managers, and citizen complaints.

Comprehensive enough to provide managers and executives with understanding of labor and material expenditures to plan for future labor and financial needs.

Rugged enough to be of use for future users to intuitively understand the value of the system.

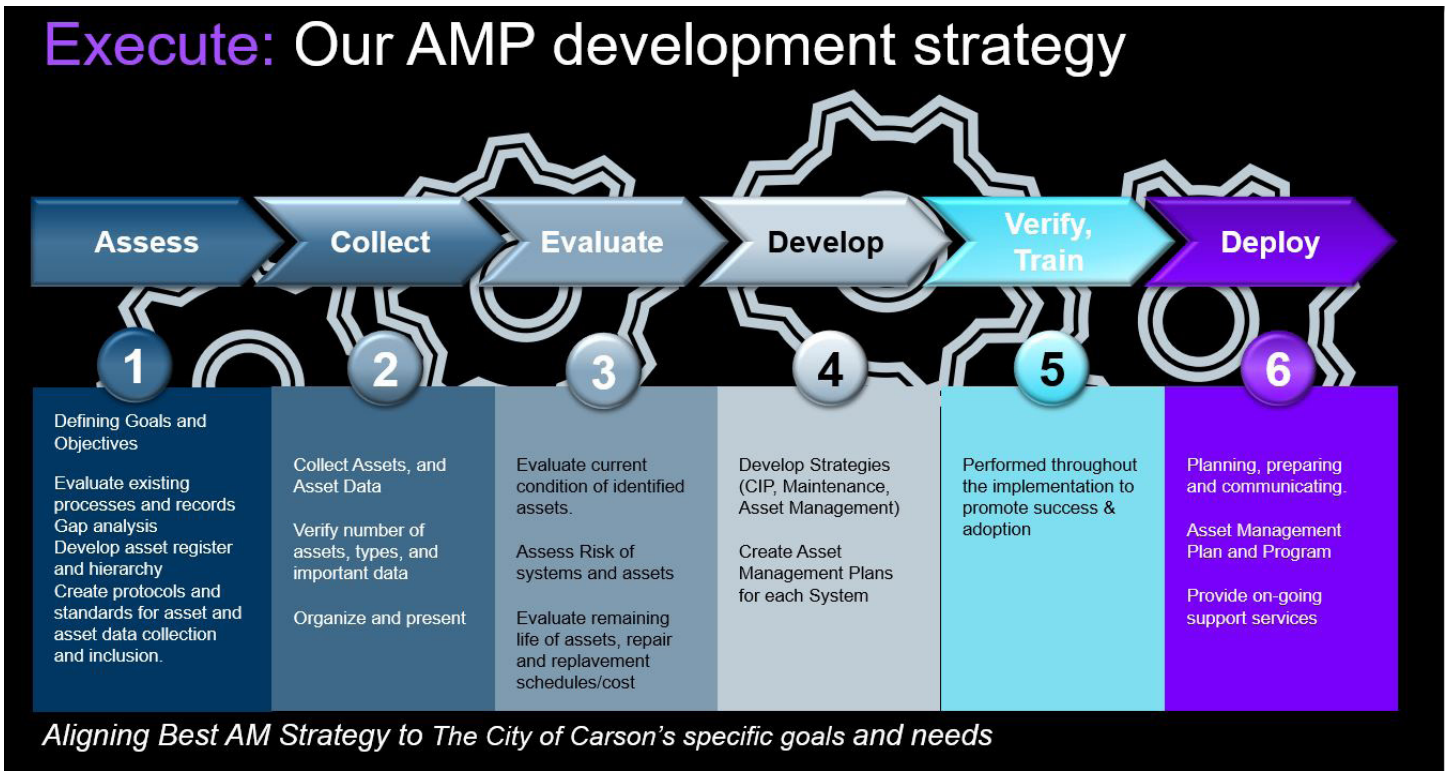
GHD will perform a review of the current CMMS systems in use by Public Works, iWorQ, to identify capabilities of the system and its ability to achieve the departmental goals for the system. GHD will also review the current data housed in the existing CMMS, its workflows and business rules, and other pertinent criteria.

GHD will take the results from the evaluations of the current CMMS (iWorQ), compare them against the needs and desired levels of service of Public Works, and identify the feasibility of the existing system. GHD will also compare iWorQ against other recommended CMMS software's that satisfy the LOS and needs requirements and provide the City with a summary report and recommendations for moving forward.

Deliverables:
4-hour Discovery and Data Review Workshop
2, 4-hour Functional Requirements, and Needs Assessment Workshops
Written Summary Report of CMMS Recommendations, Functionality, and Vendors

4.2: CMMS implementation Strategy Planning

GHD will work with City of Carson Key Staff to develop and deploy a tailored implementation strategy for the selected CMMS/EAM system. The Strategy will focus will be on developing effective business rules and workflows that focus on the needs of the City, are purpose driven to maximize ease of use and understanding for the end users and fit the City of Carson's asset management strategy.



GHD has developed a six-step strategy (above) to maximize the implementation process and ensure the above goals are met. This strategy is aligned with the City's Asset Management Program, strategy and goals; and is predicated on its ability to be useful in the achievement of those goals and fit into the operational culture of the various Public Works Department.

Task 5: Project Management

5.1: Kick off Meeting

As prescribed in the RFP, key GHD staff will meet with City of Carson staff to agree on Project Plan, Milestone Objectives and Meetings schedule.

5.2: Project Management, Quality Assurance and Quality Control

The successful management of project scope, budget, schedule, quality, and risk over the course of the project is of utmost importance to the GHD team. As skilled, professional project managers who also guide and advise clients on their practices, we stake our reputation on it.

Therefore, we use best practices for project monitoring and control that are fit for purpose, with the goal of demonstrating to the City of Carson what the benefits are of adopting a consistent, systematic, professional approach to project management. Elements of this approach are described below.

Ryan Johnson is our proposed Project Manager. Ryan brings over 15 years of experience in working in the Public and Private Sectors and understands a client's perspective and requirements for effective project management, communication, and quality control. Jennifer Dustin will be serving as Assistant Project Manager. Jennifer brings her skills as a Certified Associate of Project Management to the table to help keep this project on time and budget. Jennifer has over 15 years of experience in finance, administration, and project management.

5.3: Project Management Plan

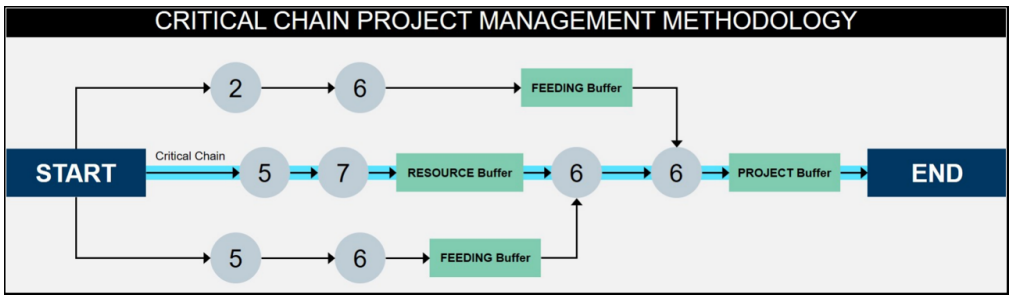
GHD's approach to project management is to execute the project efficiently and effectively through strong collaboration and communication with the City of Carson's Project Manager and the project team. The key element in staying on track with the proposed scope of work and schedule is timely communication between the project team and the City Carson, and preventing errors that can lead to cost, schedule, and quality issues.

Ryan Johnson will be the primary point of contact between The City of Carson and the GHD project team, coupled with our internal management protocols and systems, Ryan will have overall responsibility for the execution and delivery of this project.

We will create and use a Project Management Plan to guide the work. This Plan would typically include a clear statement of the project's purpose and goals, critical success factors, task, and deliverable schedule, and descriptions of how project quality, communications, changes, documentation, and risks will be monitored and controlled. GHD's Project Manager will continuously monitor and control the project, confirming that project requirements are met using the appropriate methods. The GHD Project Manager will work with the GHD Assistant Project Manager to oversee task execution, quality control and submittal of deliverables, document management, identify and manage risks, and track costs and progress relative to schedule.

5.4: Critical Path Method of Schedule Management

Starting with the proposed high-level schedule in this proposal, the GHD Project Manager will devise a detailed project schedule. The GHD Project Manager will identify the Critical Path, the longest sequence of dependent tasks, which must be managed with extra care to meet the City's deadline for completing the project.



5.5: Earned Value Management of Scope, Budget, and Schedule

In line with best practices, the GHD Project Manager will use Earned Value Management to monitor and compare progress on tasks with the costs expended, to check for ongoing alignment between scope, budget, and schedule. The Project Manager will begin by preparing a work breakdown structure, dividing tasks and allocating budgets into units of work to be completed on the defined project schedule. On a weekly basis, the Project Manager will assess progress in terms of task completion and schedule expended and compare it to the costs incurred to-date.

5.6: Contract Changes to Scope, Budget, and Schedule

Any potential changes identified by GHD will be recorded in a Contract Change Log and communicated to the City for discussion. Potential changes to scope will be evaluated for impacts on budget and schedule; changes to budget will be evaluated for impacts on scope and schedule; and changes to schedule will be evaluated for impacts to scope and budget. Results of the discussion between GHD and the City of potential changes will be tracked on the log and the City's procedures for executing change orders will be followed for those changes approved by the city.

5.7: Quality Management

GHD operates under a Practice Quality Management System, ISO 9001:2015 and is certified by Lloyds Register of Quality Assurance. Our adherence system focuses on ensuring the right personnel, with the right skill and authorities are in place to manage and execute projects. It also verifies that our work products and approach are peer reviewed and aligned with the project goals and contract requirements, with the proper standard of care applied at all project levels. The core of our quality management focuses on the pillars of QA/QC management- *Traceability, Accountability, Competency, Consistency and Continuous Improvement*.

Quality control is paramount to the success of this project. We will achieve quality control through proper monitoring, measurement, and accountability. As part of our Project Management effort, we work to ensure the right oversight, verification, and validation occurs. This is critical, and a step not typically implemented through fruition by other Consultants. Verification is a step where one confirms that the problem or question was solved correctly, in a repeatable and traceable manner. Validation is the process of confirming that the right question or problem is asked and identified. Which, especially for this type of project, requires a holistic and diverse perspective, from those with experience in Asset Management and Risk Based Prioritization of Capital Projects.

5.8: Risk Management

As part of our approach, a project risk register is created and maintained by the GHD Project Manager. The risk register will generally include both project-based risks and opportunities that may impact overall project success. The project risk and opportunities will be shared with the City's Project Manager on a regular basis. While the overall project risk management accountability resides with the GHD Project Manager, every participant of the project including the client, shares the responsibility to identify, assess, and manage risk.

5.9: Communications Management

Effective communication is critical to the success of any project. There will be multiple forms of communication used over the course of this Project, including written documents and deliverables, interviews, workshops, meetings, emails, web conferences, and phone calls. The Project Management Plan includes coverage of communications, including preferred methods, lines of communications, and frequency. The role of Project Coordinator includes facilitating communication and document management.

The GHD team will work with the city of Carson to develop a communication and meeting plan that will support the delivery of the program. As requested, GHD will provide the city with agendas for each engagement at least 24-hours prior to meeting or workshop. These agendas, and resulting meeting minutes, will be stored on the program's SharePoint site.

Through GHD's experience in managing similar programs, we believe open and regular communication is critical for success. The following meetings and workshops are assumed as part of the program, but other meetings and workshops

may be required to effectively deliver the program for the City. These additional meetings will be discussed and scheduled on an as needed basis with the required stakeholders. The currently proposed meetings are:

Deliverables:
4-hour In Person Program Kickoff
1-hour Virtual Bi-weekly Progress Meetings
Project Management Plan

Task 6: Development of Strategic Asset Management Plan (GHD Recommended)

GHD's development of the City of Carson's Strategic Asset Management Plan includes multiple tasks related to refinement of the City's current asset management practices, and the integration of GHD's best practices. GHD proposes developing an overarching Strategic Asset Management Plan, aligning the City's Mission, Values and Goals, and Level of Service Goals (LOS), to drive and support development and implementation of the individual Asset Management Program pieces requested in this RFP.

Vision

Carson: a thriving, diverse, destination city – a great place to live, work and play with an unlimited future.

Mission

To serve and enhance the quality of life of residents and businesses through engagement and the efficient delivery of exceptional services

Top 4 Priorities

- Quality of Life Improvements (infrastructure, maintenance, and beautification)
- Economic Development / Community Benefits
- Governance Policies pertaining to districts in the City
- Public Safety

These Asset Management Plans will incorporate an asset register, condition assessment, risk analysis, life-cycle analysis, and capital investment/major repair and replacement strategy (schedule and costing) for each of the following areas:

- Roadway
- Parks
- Buildings/Facilities
- Right-of-Way Assets
- As Needed/identified by the City

6.1: Levels of Service and Key Performance Indicators

6.1.1: LOS and KPI Development

Possibly the most important function of a successful AMP, is the clear identification of the desired Level of Service (LOS). GHD, with key City of Carson Staff, will develop and define LOS and KPIs, for whole of business and for the five specific service areas. These LOS statements will focus resources where they have the most impact of achieving the desired goals, and guide decision making to the most effective stat KPIs will be developed to be effective in monitoring performance health and progress towards the identified LOS goals. They will be specific, effective, and provide value to City of Carson staff in evaluating and making decisions about its asset management program.

6.1.2: LOS and KPI Monitoring and Reporting Procedures

Once the LOS and KPI metrics are established, GHD will initiate and document monitoring and reporting procedures. These procedures will ensure visibility to the necessary stakeholders, and clearly present the needed information to make better informed decisions. As part of these monitoring and reporting procedures, an initial evaluation of the current state will provide an understanding of the funding gaps and resources needed to fulfill each LOS & KPI for the next 10 years. This report shall identify (at a minimum) funding needed to hire additional employees (if applicable), new equipment's, changes to operations, and any modification required in the CMMS system (or other software) to achieve the LOS & KPI goals.

Deliverables:
4-hour In Person LOS and KPI Workshop

6.2: Prioritized Capital Improvement Plan Project List and Report

Using the outputs and analysis from the previous tasks, GHD will identify the list of short-term project needs (1-5 years) by applying the core risk and risk management zone approach described above. Identification of well capital needs will be supplemented by the analysis and results from all tasks will be documented in a report that will include risk management guidelines, procedures, condition assessment protocols, and criticality assessment methodology.

Deliverables:
Draft CIP list and Budget Report
Final CIP and Budget Report

6.3: Recurring Asset Management Activities

GHD will coordinate with the City of Carson staff to understand and document current asset management and maintenance activities for qualifying assets. These activities will be documented in the respective AMP's, and include processes for recurring maintenance and inspection activities, data collection and history, and repair/replacement strategies and planning for qualifying assets. Detail will be included for how the decisions are made, and what the involvement of key City of Carson and Contractor staff are required.

Deliverables:
4-hour In Person Recurring Asset Management Activities Workshop

6.3: Strategic Asset Management Plan Finalization

GHD's final SAMP will satisfy the following goals:

- Understanding of the current state of the City's infrastructure and its future needs.
- Provide asset management and asset life-cycle profiles to influence decisions intended to optimize reinvestment and stewardship of city infrastructure to meet service expectations.
- Utilize CMMS and geographic information systems (GIS) technology to proactively identify the asset replacement and rehabilitation needs and plan the budget and resources, accordingly, incorporating all aspects of the Asset Management Plan.
- Understand the probability and consequence of failure of each asset class so that the City can manage high risk assets before failure and minimize the City's overall risk profile;
- Minimize the life-cycle cost by incorporating the latest technological advances in infrastructure to develop efficient and effective preservation and restoration strategies as well as monitoring strategies.
- Develop a consistent and defend-able methodology for prioritizing work and budget expenditures by directly linking strategic asset management to strategic financial planning.
- Focus on high benefit-to-cost ratio to ensure the budget is spent in the right place, for the right reason, at the right time, at the right cost.
- Create transparency through easily understood visualizations and information to ensure an alignment of asset management procedures and needs.
- CIP Projection: 5-year CIP project list with schedule and funding based on the Business Risk Exposure

Deliverables:
Draft Strategic Asset Management Plan
4-hour Draft Review Workshop
Final Strategic Asset Management Plan
2-hour In Person SAMP Presentation

→ Recommended Activities not Included in this RFP

The following sections detail the activities GHD recommends for achieving the maximum results from the project; effect the greatest reduction in risk and realize the greatest cost savings year over year. With the AMP's and strategy developed in the scope of work of this project, effective deployment of them is the next critical phase. There are significant operational and maintenance savings, as well as Capital Improvement Planning and reduction of risk to be realized through an effective implementation.

Strategic Asset Management Plan Implementation

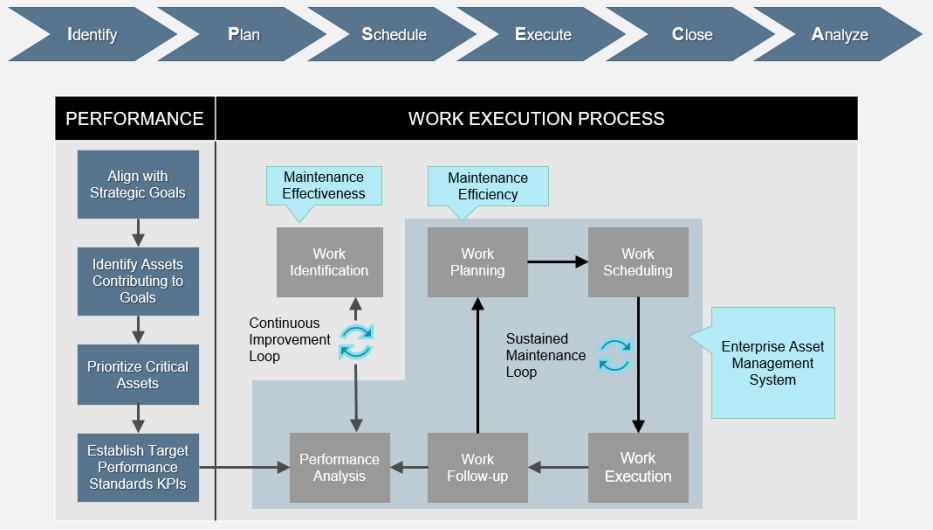
Once the City of Carson's SAMP is completed and approved, GHD will assist the City of Carson with implementation. GHD will provide a detailed workflow/methodology for implementation, and guide and champion the process. Key will be the transfer of knowledge, understanding of processes and ownership of the program by City of Carson Staff. Development of the Preventative Maintenance (PM) plan, Corrective Maintenance (CM) plan, Predictive Maintenance (PdM) plan, and inspection program will enable the City to strategically maintain its assets to mitigate the risks identified and evaluated in the creation of the AMP. It will identify staffing/personnel, workload, and resources needed to affect the needed maintenance programs for each System.

Business Initiative Improvement Recommendations

Through the course of project execution and staff interviews, workshops, and discussion, business process initiative improvements may be discovered that do not specifically fall under any of the previous tasks. These should be captured and documented and reviewed by the City and GHD prior to implementation of the SAMP. A strategy to improve these items should be developed before SAMP implementation to ensure the greatest effect and impact of the Asset Management Program

Business Risk Asset Management

GHD will develop an action plan and schedule for the maintenance of each qualifying assets based on the risk(s) identified in our BRE evaluation. This will be a deployable Maintenance plan and schedule, focused on the activities that best prevent, or mitigate the functional failures identified. Based on the qualifying assets rankings, they will be placed into four main categories of action. Progressive in nature, from a normal preventative maintenance intervention and schedule and tasks to immediate replacement or repair because of imminent failure. This will be clearly delineated and set up to sort and track assets from one category to the next, as they effectively change.



Strategic Funding Strategies

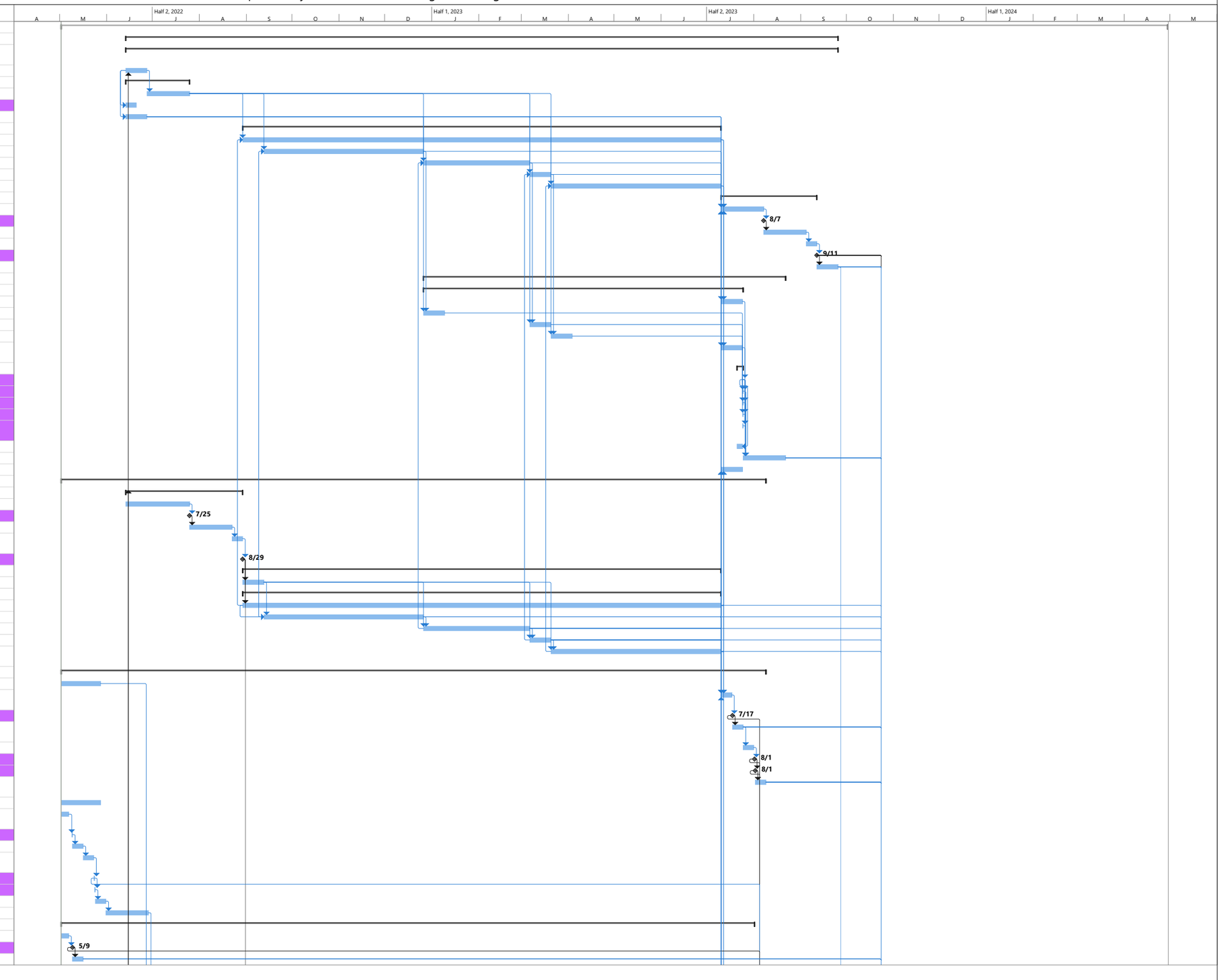
GHD shall provide the development of strategic asset management funding strategies, that will allow the ability for ongoing review and sustainment. Developing the Business Cases for initial investments in changes to Maintenance and Operational strategies/activities and identifying the ROI for each. Identifying the most effective and strategic funding strategies to facilitate.

Proposed Schedule

Our proposed schedule can be found on the next page, in MS Project format.

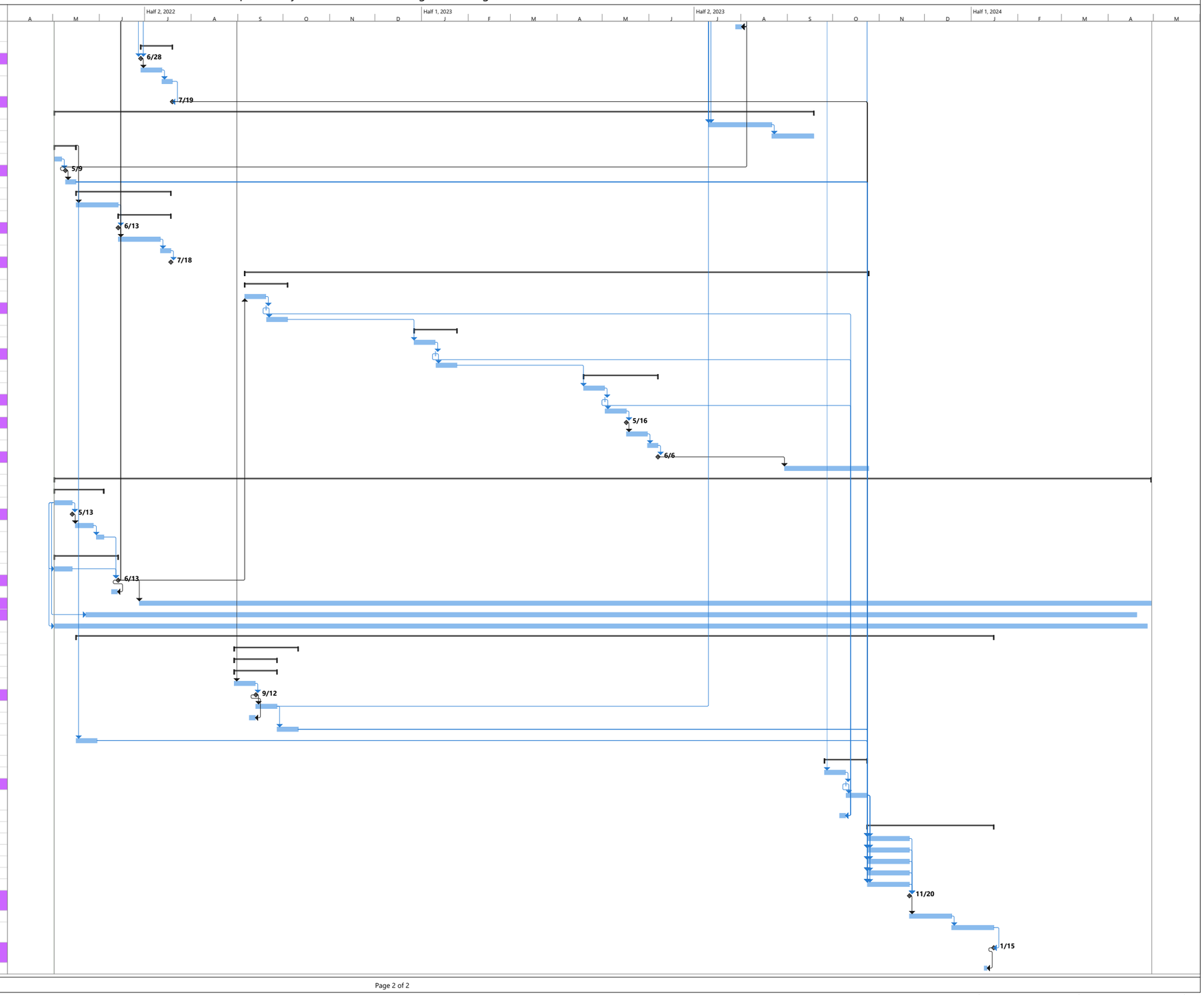
Proposed City of Carson Asset Management Program Schedule

ID	Type	WBS	Task Name	Duration	Start	Finish
0	**Fixed Durati**	**CLF-**	**City of Carson Schedule**	**520.5 days**	**5/2/22**	**4/29/24**
1	**Fixed Durati**	**CLF-1**	**Asset Categorization**	**335 days**	**6/13/22**	**9/25/23**
2	**Fixed Duration**	**CLF-1.1**	**Existing Information Review and Asset Data Collection/Inventory**	**335 days**	**6/13/22**	**9/25/23**
3	Fixed Work	CLF-1.1.1	Data Reconnaissance	2 wks	6/13/22	6/27/22
4	**Fixed Durati**	**CLF-1.1.2**	**Data Sourcing**	**30 days**	**6/13/22**	**7/25/22**
5	Fixed Work	CLF-1.1.2.1	Data Sourcing	4 wks	6/27/22	7/25/22
6	Fixed Work	CLF-1.1.2.2	Staff Interviews	1 wk	6/13/22	6/20/22
7	Fixed Work	CLF-1.1.3	GIS Development and Prep	2 wks	6/13/22	6/27/22
8	**Fixed Durati**	**CLF-1.1.4**	**Citywide Asset Inventory**	**225 days**	**8/29/22**	**7/10/23**
9	Fixed Work	CLF-1.1.4.1	Roadways Inventory	45 wks	8/29/22	7/10/23
10	Fixed Work	CLF-1.1.4.2	Right-of-Way Inventory	75 days	9/12/22	12/26/22
11	Fixed Work	CLF-1.1.4.3	Parks Inventory	50 days	12/26/22	3/6/23
12	Fixed Work	CLF-1.1.4.4	Buildings Inventory	2 wks	3/6/23	3/20/23
13	Fixed Work	CLF-1.1.4.5	As Needed/Identified by the City Inventory	80 days	3/20/23	7/10/23
14	**Fixed Durati**	**CLF-1.1.5**	**Asset Inventory Gap Assessment**	**45 days**	**7/10/23**	**9/11/23**
15	Fixed Work	CLF-1.1.5.1	Compile Inventory Gap Assessment	4 wks	7/10/23	8/7/23
16	Fixed Work	CLF-1.1.5.2	Draft Gap Assessment Submitted	0 days	8/7/23	8/7/23
17	Fixed Work	CLF-1.1.5.3	City Review of Gap Assessment	4 wks	8/7/23	9/4/23
18	Fixed Work	CLF-1.1.5.4	Incorporate Comments into Gap Assessment	1 wk	9/4/23	9/11/23
19	Fixed Work	CLF-1.1.5.5	Final Gap Assessment Submitted	0 days	9/11/23	9/11/23
20	Fixed Work	CLF-1.1.6	Data Collection and Management	2 wks	9/11/23	9/25/23
21	**Fixed Durati**	**CLF-1.2**	**Asset Register Development (Asset Definition)**	**170.5 days**	**12/26/22**	**8/21/23**
22	**Fixed Durati**	**CLF-1.2.1**	**Asset Register Creation, Identification**	**150.5 days**	**12/26/22**	**7/24/23**
23	Fixed Work	CLF-1.2.1.1	Roadways Asset Register Creation	2 wks	7/10/23	7/24/23
24	Fixed Work	CLF-1.2.1.2	Right-of-Way Asset Register Creation	2 wks	12/26/22	1/9/23
25	Fixed Work	CLF-1.2.1.3	Parks Asset Register Creation	2 wks	3/6/23	3/20/23
26	Fixed Work	CLF-1.2.1.4	Buildings Asset Register Creation	2 wks	3/20/23	4/3/23
27	Fixed Work	CLF-1.2.1.5	As Needed/Identified by the City Asset Register Creation	2 wks	7/10/23	7/24/23
28	**Fixed Durati**	**CLF-1.2.1.6**	**Workshops**	**2 days**	**7/21/23**	**7/24/23**
29	Fixed Work	CLF-1.2.1.6.1	Roadways Asset Register Workshop	2 hrs	7/24/23	7/24/23
30	Fixed Work	CLF-1.2.1.6.2	Right-of-Way Asset Register Workshop	2 hrs	7/24/23	7/24/23
31	Fixed Work	CLF-1.2.1.6.3	Parks Asset Register Workshop	2 hrs	7/24/23	7/24/23
32	Fixed Work	CLF-1.2.1.6.4	Buildings Asset Register Workshop	2 hrs	7/24/23	7/24/23
33	Fixed Work	CLF-1.2.1.6.5	As Needed/Identified by the City Asset Register Workshop	2 hrs	7/24/23	7/24/23
34	Fixed Work	CLF-1.2.1.6.6	TRAVEL FOR REGISTER WORKSHOPS IF IN PERS	1.5 days	7/21/23	7/24/23
35	Fixed Work	CLF-1.2.2	Asset Hierarchy Development	4 wks	7/25/23	8/21/23
36	Fixed Work	CLF-1.2.3	Uploading Asset Data to GIS	2 wks	7/10/23	7/24/23
37	**Fixed Durati**	**CLF-2**	**Risk Prioritization Plan**	**332 days**	**5/2/22**	**8/8/23**
38	**Fixed Durati**	**CLF-2.1**	**Existing Condition Assessment Review**	**55 days**	**6/13/22**	**8/29/22**
39	Fixed Work	CLF-2.1.1	Condition Assessment Criteria Development	6 wks	6/13/22	7/25/22
40	Fixed Work	CLF-2.1.2	Draft Condition Assessment Criteria Submitted	0 days	7/25/22	7/25/22
41	Fixed Work	CLF-2.1.3	City Review of Condition Assessment Criteria	4 wks	7/25/22	8/22/22
42	Fixed Work	CLF-2.1.4	Incorporate Comments into Condition Assessment Criteria	1 wk	8/22/22	8/29/22
43	Fixed Work	CLF-2.1.5	Final Condition Assessment Criteria Submitted	0 days	8/29/22	8/29/22
44	**Fixed Durati**	**CLF-2.2**	**Condition Assessment Database**	**225 days**	**8/29/22**	**7/10/23**
45	Fixed Work	CLF-2.2.1	Prep ASSIST Tool for Use	2 wks	8/29/22	9/12/22
46	**Fixed Durati**	**CLF-2.2.2**	**Field Data Collection**	**225 days**	**8/29/22**	**7/10/23**
47	Fixed Work	CLF-2.2.2.1	Roadways Condition Assessment	45 wks	8/29/22	7/10/23
48	Fixed Work	CLF-2.2.2.2	Right-of-Way Condition Assessment	75 days	9/12/22	12/26/22
49	Fixed Work	CLF-2.2.2.3	Parks Condition Assessment	50 days	12/26/22	3/6/23
50	Fixed Work	CLF-2.2.2.4	Buildings Condition Assessment	2 wks	3/6/23	3/20/23
51	Fixed Work	CLF-2.2.2.5	As Needed/Identified by the City Condition Assessment	80 days	3/20/23	7/10/23
52	**Fixed Durati**	**CLF-2.3**	**Risk Analysis**	**332 days**	**5/2/22**	**8/8/23**
53	Fixed Work	CLF-2.3.1	Probability of Failure	4 wks	5/2/22	5/27/22
54	Fixed Work	CLF-2.3.2	Probability of Failure Criteria Development Workshop Prep	1 wk	7/10/23	7/17/23
55	Fixed Work	CLF-2.3.3	Probability of Failure Criteria Development Works	4 hrs	7/17/23	7/17/23
56	Fixed Work	CLF-2.3.4	Probability of Failure Criteria Development Workshop Follow-up	1 wk	7/18/23	7/24/23
57	Fixed Work	CLF-2.3.5	Probability of Failure Score Assignment Workshop F	1 wk	7/25/23	7/31/23
58	Fixed Work	CLF-2.3.6	Probability of Failure Score Assignment Workshop	4 hrs	8/1/23	8/1/23
59	Fixed Work	CLF-2.3.7	Probability of Failure Score Assignment Workshop	4 hrs	8/1/23	8/1/23
60	Fixed Work	CLF-2.3.8	Probability of Failure Score Assignment Workshop Follow-up	1 wk	8/2/23	8/8/23
61	Fixed Work	CLF-2.3.9	Consequence of Failure	4 wks	5/2/22	5/27/22
62	Fixed Work	CLF-2.3.10	Consequence of Failure Criteria Development Workshop Prep	1 wk	5/2/22	5/6/22
63	Fixed Work	CLF-2.3.11	Consequence of Failure Criteria Development Wor	4 hrs	5/9/22	5/9/22
64	Fixed Work	CLF-2.3.12	Consequence of Failure Criteria Development Follo	1 wk	5/9/22	5/16/22
65	Fixed Work	CLF-2.3.13	Consequence of Failure Score Assignment Workshop Prep	1 wk	5/16/22	5/23/22
66	Fixed Work	CLF-2.3.14	Consequence of Failure Score Assignment Worksh	4 hrs	5/23/22	5/23/22
67	Fixed Work	CLF-2.3.15	Consequence of Failure Score Assignment Worksh	4 hrs	5/24/22	5/24/22
68	Fixed Work	CLF-2.3.16	Consequence of Failure Score Assignment Follow-u	1 wk	5/24/22	5/31/22
69	Fixed Work	CLF-2.3.17	Business Risk Exposure Identification	4 wks	5/31/22	6/28/22
70	**Fixed Durati**	**CLF-2.3.18**	**Levels of Service Definition Workshop**	**326.5 days**	**5/2/22**	**8/1/23**
71	Fixed Work	CLF-2.3.18.1	Levels of Service Definition Workshop Prep	1 wk	5/2/22	5/6/22
72	Fixed Work	CLF-2.3.18.2	Levels of Service Definition Workshop	4 hrs	5/9/22	5/9/22
73	Fixed Work	CLF-2.3.18.3	Levels of Service Definition Workshop Follow-up	1 wk	5/9/22	5/16/22



Proposed City of Carson Asset Management Program Schedule

ID	Type	WBS	Task Name	Duration	Start	Finish
74	Fixed Work	CLF-2.3.18.4	TRAVEL FOR Levels of Service Definition WORKSHOP IF IN PERSON	2 days	7/28/23	8/1/23
75	**Fixed Duratic**	**CLF-2.3.19**	**Risk Analysis Report**	**15 days**	**6/28/22**	**7/19/22**
76	**Fixed Work**	**CLF-2.3.19.1**	**Draft Risk Analysis Report Submitted**	**0 days**	**6/28/22**	**6/28/22**
77	Fixed Work	CLF-2.3.19.2	City Review	2 wks	6/28/22	7/12/22
78	Fixed Work	CLF-2.3.19.3	Incorporate Comments and Finalize Risk Analysis Report	1 wk	7/12/22	7/19/22
79	**Fixed Work**	**CLF-2.3.20**	**Final Risk Analysis Report Submitted**	**0 hrs**	**7/19/22**	**7/19/22**
80	**Fixed Duratic**	**CLF-3**	**Development of Capital Replacement Budget**	**360.5 days**	**5/2/22**	**9/18/23**
81	Fixed Work	CLF-3.1	Remaining Useful Life	6 wks	7/10/23	8/21/23
82	Fixed Work	CLF-3.2	Capital Planning, Replacement Strategy Development	4 wks	8/21/23	9/18/23
83	**Fixed Duratic**	**CLF-3.3**	**Capital Planning Workshop**	**10.5 days**	**5/2/22**	**5/16/22**
84	Fixed Work	CLF-3.3.1	Capital Planning Workshop Prep	1 wk	5/2/22	5/6/22
85	**Fixed Work**	**CLF-3.3.2**	**Capital Planning Workshop**	**4 hrs**	**5/9/22**	**5/9/22**
86	Fixed Work	CLF-3.3.3	Capital Planning Workshop Follow-up	1 wk	5/9/22	5/16/22
87	**Fixed Duratic**	**CLF-3.4**	**Risk Prioritization**	**45 days**	**5/16/22**	**7/18/22**
88	Fixed Work	CLF-3.4.1	Risk Prioritization Plan Development	4 wks	5/16/22	6/13/22
89	**Fixed Duratic**	**CLF-3.4.2**	**Risk Prioritization Plan Report**	**25 days**	**6/13/22**	**7/18/22**
90	**Fixed Work**	**CLF-3.4.2.1**	**Risk Prioritization Plan Report Submitted**	**0 days**	**6/13/22**	**6/13/22**
91	Fixed Work	CLF-3.4.2.2	City Review of Risk Prioritization Plan Report	4 wks	6/13/22	7/11/22
92	Fixed Work	CLF-3.4.2.3	Incorporate Comments	1 wk	7/11/22	7/18/22
93	**Fixed Work**	**CLF-3.4.2.4**	**Risk Prioritization Plan Submitted**	**0 days**	**7/18/22**	**7/18/22**
94	**Fixed Duratic**	**CLF-4**	**CMMS Software Evaluation**	**296.5 days**	**9/5/22**	**10/24/23**
95	**Fixed Duratic**	**CLF-4.1**	**Discovery Workshop**	**20.5 days**	**9/5/22**	**10/3/22**
96	Fixed Work	CLF-4.1.1	Discovery Workshop Prep	2 wks	9/5/22	9/19/22
97	**Fixed Work**	**CLF-4.1.2**	**Discovery Workshop**	**4 hrs**	**9/19/22**	**9/19/22**
98	Fixed Work	CLF-4.1.3	Discovery Workshop Follow-up	2 wks	9/20/22	10/3/22
99	**Fixed Duratic**	**CLF-4.2**	**Functional Requirements Workshop**	**20.5 days**	**12/27/22**	**1/24/23**
100	Fixed Work	CLF-4.2.1	Functional Requirements Workshop Prep	2 wks	12/27/22	1/9/23
101	**Fixed Work**	**CLF-4.2.2**	**Functional Requirements Workshop**	**4 hrs**	**1/10/23**	**1/10/23**
102	Fixed Work	CLF-4.2.3	Functional Requirements Workshop Follow-up	2 wks	1/10/23	1/24/23
103	**Fixed Duratic**	**CLF-4.3**	**Needs Assessment Workshop**	**35.5 days**	**4/18/23**	**6/6/23**
104	Fixed Work	CLF-4.3.1	Needs Assessment Workshop Prep	2 wks	4/18/23	5/2/23
105	**Fixed Work**	**CLF-4.3.2**	**Needs Assessment Workshop**	**4 hrs**	**5/2/23**	**5/2/23**
106	Fixed Work	CLF-4.3.3	Needs Assessment Workshop Follow-up	2 wks	5/3/23	5/16/23
107	**Fixed Work**	**CLF-4.3.4**	**Draft Needs Analysis Report Submitted**	**0 days**	**5/16/23**	**5/16/23**
108	Fixed Work	CLF-4.3.5	City Review of Needs Analysis Report	2 wks	5/17/23	5/30/23
109	Fixed Work	CLF-4.3.6	Incorporate Comments to Needs Analysis Report	1 wk	5/31/23	6/6/23
110	**Fixed Work**	**CLF-4.3.7**	**Final Needs Analysis Report Submitted**	**0 days**	**6/6/23**	**6/6/23**
111	Fixed Work	CLF-4.4	CMMS Implementation Strategy Planning	8 wks	8/30/23	10/24/23
112	**Fixed Duratic**	**CLF-5**	**Project Management**	**520.5 days**	**5/2/22**	**4/29/24**
113	**Fixed Duratic**	**CLF-5.1**	**Project Management Plan**	**25 days**	**5/2/22**	**6/3/22**
114	Fixed Work	CLF-5.1.1	Develop Project Management Plan	2 wks	5/2/22	5/13/22
115	**Fixed Work**	**CLF-5.1.2**	**Draft Project Management Plan Submitted**	**0 days**	**5/13/22**	**5/13/22**
116	Fixed Work	CLF-5.1.3	City Review	2 wks	5/16/22	5/27/22
117	Fixed Work	CLF-5.1.4	Incorporate Comments into the Project Management Plan	1 wk	5/30/22	6/3/22
118	**Fixed Duratic**	**CLF-5.2**	**Project Kick Off Meeting**	**30.5 days**	**5/2/22**	**6/13/22**
119	Fixed Work	CLF-5.2.1	Kick Off Prep	2 wks	5/2/22	5/13/22
120	**Fixed Work**	**CLF-5.2.2**	**Kick Off Meeting**	**4 hrs**	**6/13/22**	**6/13/22**
121	Fixed Work	CLF-5.2.3	TRAVEL FOR WORKSHOPS IF IN PERSON	2 days	6/9/22	6/13/22
122	**Fixed Work**	**CLF-5.3**	**Bi-Weekly Progress Meetings**	**24 mons**	**6/27/22**	**4/29/24**
123	**Fixed Work**	**CLF-5.4**	**Monthly Invoicing and Progress Report**	**25 mons**	**5/23/22**	**4/19/24**
124	Fixed Work	CLF-5.5	Project Coordination, Schedule Maintenance	26 mons	5/2/22	4/26/24
125	**Fixed Duratic**	**CLF-6**	**Development of Strategic Asset Management Plan**	**435.5 days**	**5/16/22**	**1/15/24**
126	**Fixed Duratic**	**CLF-6.1**	**Levels of Service and Key Performance Indicators**	**30.5 days**	**8/29/22**	**10/10/22**
127	**Fixed Duratic**	**CLF-6.1.1**	**LOS and KPI Development**	**20.5 days**	**8/29/22**	**9/26/22**
128	**Fixed Duratic**	**CLF-6.1.1.1**	**LOS and KPI Workshop**	**20.5 days**	**8/29/22**	**9/26/22**
129	Fixed Work	CLF-6.1.1.1.1	LOS and KPI Workshop Prep	2 wks	8/29/22	9/12/22
130	**Fixed Work**	**CLF-6.1.1.1.2**	**LOS and KPI Workshop**	**4 hrs**	**9/12/22**	**9/12/22**
131	Fixed Work	CLF-6.1.1.1.3	LOS and KPI Workshop Follow-up	2 wks	9/13/22	9/26/22
132	Fixed Work	CLF-6.1.1.1.4	TRAVEL FOR LOS AND KPI WORKSHOP IF IN PE	2 days	9/8/22	9/12/22
133	Fixed Work	CLF-6.1.2	LOS and KPI Monitoring and Reporting Procedures	2 wks	9/27/22	10/10/22
134	Fixed Work	CLF-6.2	Prioritized Capital Improvement Plan Project List and Report	2 wks	5/16/22	5/30/22
135	**Fixed Duratic**	**CLF-6.3**	**Recurring Asset Management Activities Workshop**	**20.5 days**	**9/25/23**	**10/23/23**
136	Fixed Work	CLF-6.3.1	Recurring Asset Management Activities Prep	2 wks	9/25/23	10/9/23
137	**Fixed Work**	**CLF-6.3.2**	**Recurring Asset Management Activities Workshop**	**4 hrs**	**10/9/23**	**10/9/23**
138	Fixed Work	CLF-6.3.3	Recurring Asset Management Activities Workshop Follow-up	2 wks	10/10/23	10/23/23
139	Fixed Work	CLF-6.3.4	TRAVEL FOR RAMA WORKSHOP IF IN PERSON	2 days	10/5/23	10/9/23
140	**Fixed Duratic**	**CLF-6.4**	**Finalized Strategic Asset Management Plan**	**60 days**	**10/24/23**	**1/15/24**
141	Fixed Work	CLF-6.4.1	Finalize Roadways Section	4 wks	10/24/23	11/20/23
142	Fixed Work	CLF-6.4.2	Finalize Right-of-Way Section	4 wks	10/24/23	11/20/23
143	Fixed Work	CLF-6.4.3	Finalize Parks Section	4 wks	10/24/23	11/20/23
144	Fixed Work	CLF-6.4.4	Finalize Buildings Section	4 wks	10/24/23	11/20/23
145	Fixed Work	CLF-6.4.5	Finalize As Needed/Identified by the City Section	4 wks	10/24/23	11/20/23
146	**Fixed Work**	**CLF-6.4.6**	**Finalize Draft Strategic Asset Management Plan Submitted**	**0 days**	**11/20/23**	**11/20/23**
147	Fixed Work	CLF-6.4.7	City Review of Strategic Asset Management Plan	4 wks	11/21/23	12/18/23
148	Fixed Work	CLF-6.4.8	Incorporate Comments and Finalize Strategic Asset Management Plan	4 wks	12/19/23	1/15/24
149	**Fixed Work**	**CLF-6.4.9**	**Presentation of Revised Strategic Asset Management Plan**	**20 hrs**	**1/11/24**	**1/15/24**
150	Fixed Work	CLF-6.4.10	TRAVEL FOR PRESENTATION IF IN PERSON	1.75 days	1/9/24	1/11/24



06

Subcontractor

locations: 1775 Hancock St., Ste 120
San Diego, CA 92110

14471 Chambers Rd., Ste. 210
Tustin, CA 92780

contact: Frisco White, AIA
619-542-1188

key executives: Frisco White, AIA, President
Paul D. Westberg, AIA, Secretary

employees: 25

company description: Westberg + White, Inc. Architects and Planners, was formed by two graduates of California Polytechnic State University, San Luis Obispo, in 1986. The firm incorporated on April 22, 1987, in the State of California. Paul Westberg, had a sole-proprietorship and Frisco White, left the presidency of a major design firm to form Westberg + White. Paul as Managing Partner and Frisco as Design Partner. They have been with the firm since inception. We have provided architectural services for both public and private sector clients since 1986. Since that modest beginning, Westberg + White has grown to a staff of 25 specializing in public architecture and planning

mission: Achieve as a dynamic architectural practice that strives to be on the pioneering edge of creativity, stimulation, and service to its public clients and the individuals who are the ultimate users of our designs. Our direction is clear: design and manage projects with exceptional capabilities that are fun to be in, safe, economical and function well.

services provided: Our basic services include architectural and landscape design, structural, mechanical, electrical, and civil engineering, cost estimating, and any required energy studies. If the client requires it, Surveying, Geotechnical and/or CEQA studies will be provided. As part of these basic services, we also assist the client in administering the bidding process, in selecting supplemental staff such as inspectors, and in managing the construction process, including regular site visits during construction.

service commitment: Westberg + White's customer service philosophy is that quality service to our clients is the foundation to the success of our practice. We make Excellent Service to our clients an important and key component of our business strategy. Our past customer satisfaction has been based on our clients knowing and seeing that we are responsive, knowledgeable, flexible and committed to their success and the success of their projects. This has developed in having long-term relationships with our clients, many as long as 20 years.

licenses: Licensed to practice architecture in the states of California, Washington, Nevada, Arizona, Colorado, Texas, Oklahoma, Alabama, Ohio, New Jersey and Florida

web address: wwarch.com

1775 Hancock St., Ste. 120
San Diego, CA 92110
619.542.1188
white@wwarch.com

westbergwhite
architecture

Mr. White, formally a principal and president of a nationally renowned firm, unknowingly began his career in architecture upon winning a Home Builders Association Award for residential design as a high school student in El Paso, Texas.

Through his advancement as an artist, designer/planner, vice-president of design and planning, and president, he has gained extensive years of experience in the planning and design of recreational, commercial, institutional, hospitality, restaurant, medical, recreational, high-rise, large-scale planning, urban design, residential and educational projects throughout the United States and Abroad. Mr. White, as an architect and planner, has sculptured and collaborated on numerous award winning and progressive projects.

Mr. White was the designer for the La Mirada Aquatic Center. He recently completed the design of Ocean Air Elementary School in Del Mar, CA. Frisco also designed the Abel Maldonado Community Youth Center in Santa Maria, and the award-winning Elementary Institute of Science, and the George L. Stevens Community Center in San Diego.

For the City of Carson, Frisco has completed a major project for the Carson Park Master Plan and Community Center; Carson and Hemingway Pool Renovations; remodeled the Carson Community Center; provided an Accessibility Review of City Park Buildings and Sites; developed the Limited ADA upgrade of Anderson Park and provided the concept designs for the renovation of Foisia Park. Presently, Frisco is working on the Carson Community Center Restroom Remodel and the Folding Panel Doors along with the upgrade of its lighting and sound system.

education: California Polytechnic State University, San Luis Obispo
School of Architecture, Bachelor of Architecture, 1975

professional qualification: Architect, California, 1977
Colorado, Nevada, Arizona, Texas, Oklahoma, Indiana, Florida, Washington, Ohio, New Jersey, Alabama & Kansas

professional occupation: President & Principal-in-Charge of Design
Westberg + White, Inc.
Architects•Planners
1775 Hancock St., Ste. 120
San Diego, CA 92110
1987 - Present

professional memberships:

American Institute of Architects
National Council of Architectural Registration Boards

community involvement:

Chair, Carmel Valley Community Planning Board, 2001 – present
Boardmember, Committee for Excess School Property,
San Diego Unified School District, 2006-present
Vice-Chairman, San Diego Telecommunications Task Force, 2010
Chair, Western San Dieguito River Valley NCFUA Subarea II Task Force, 2007
Boardmember, ACE San Diego, 2004-2006
Senior Member, City of San Diego Planning Commission, 1993-2000
Treasurer & Finance Committee Chairman, San Diego Education Fund, 1993-1999
Board Member, San Diego Youth Involvement, 1996-1999
Guest Lecturer, School of Architecture, Cal Poly State University, 1999
Past Mentor, Morse High School and Lincoln High School, 1994-1996
Alpha Phi Alpha, Chapter Officer, 1992-94

community recognitions:

Benjamin Banneker Architecture & Engineering Award, 1995
San Diego Voice & Viewpoint, Feature Article
San Diego Magazine, Up & Coming Architects
San Diego Museum of Art Honoree, 100 African-American Role Models, 1994
California Legislature Assembly, African-American Role Model Award, 1994
Special Sponsor, San Diego City School's Future Educators Scholarship Fund, 1993

awards:

Buelow Park, Project of the Year, 2011, APWA
Sunset Park, Project of the Year, 2010, APWA
Splash at the La Mirada Regional Aquatic Park
- 'Dream Designs' - Aquatic International, 2009
- 'Best of Aquatics' - Aquatic International, 2008
- 'Innovative Architecture & Design', Recreation Management, 2008

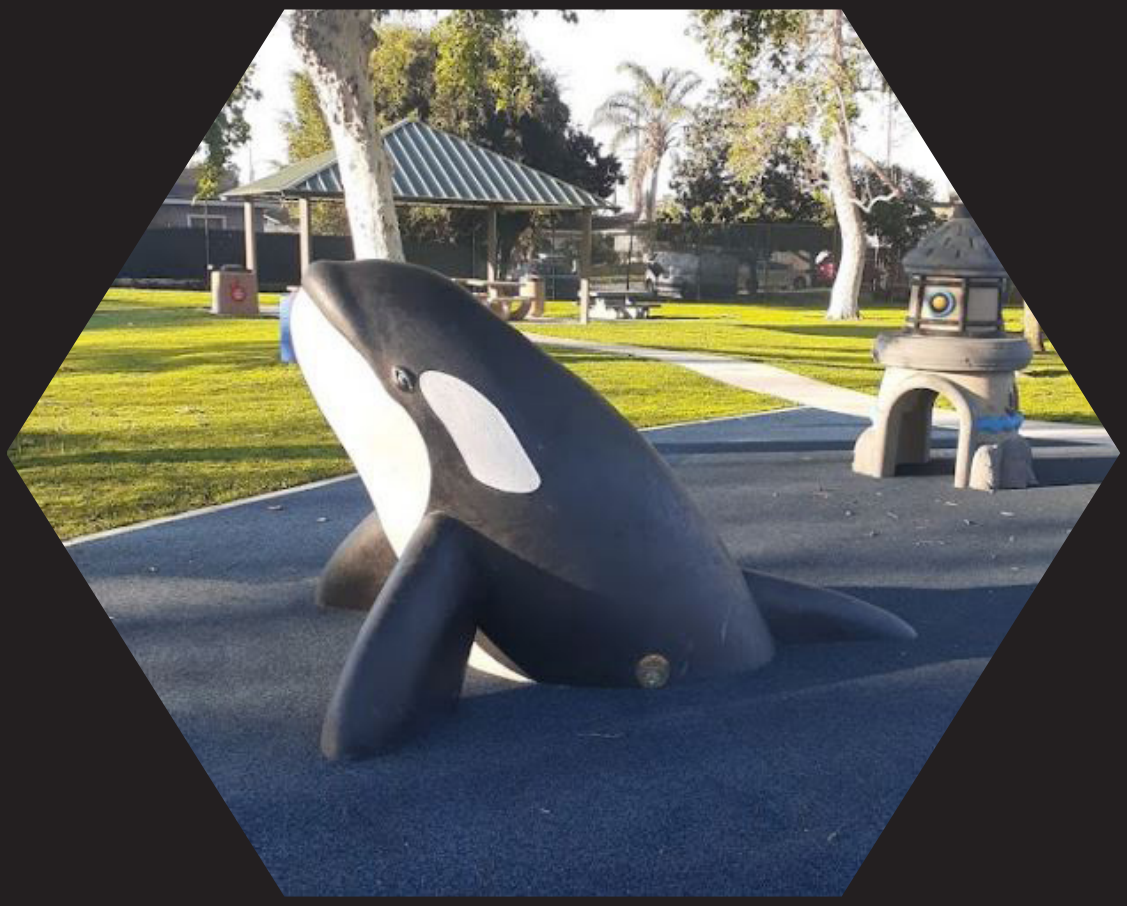
Abel Maldonado Community Youth Center, Outstanding Facility, California State Parks & Recreation Department District 8, 2003
Mountain View Community Center, California Park & Recreation Society 2004 Facility Design and Park Planning, Facility Design Award
Elementary Institute of Science, National School Board Association, 2005
Elementary Institute of Science, 2005 Impact on Learning Award, School Planning & Management, 2005
Architect of the Year, Black Contractors Association of San Diego, 2002
Numerous PCBC, SAM and Commercial/Industrial Council Awards

publication recognitions:

Cornerstone Magazine, Success by Design, Feature Article by L. Bona
Carmel Valley News, Local Leaders Look Ahead to 2010, Feature Article
Carmel Valley News, Movers and Shaker to Watch in 2009
New York Times, A Chance to Draft History, Article by C. Lubenski
The Daily Transcript, Voter-Approved Funding Facilities New High School Learning Labs and More by J. Blackford
San Diego Magazine, Up & Coming Architects, 1983

07

Cost Proposal



→ The Power of Commitment

→ Cost Proposal

Labor

	Simon Kaye	Meha Bola	Jeffrey Berk	Ryan Johnson	Jennifer Dustin	Ryan Stotz	Amber Shows	Brad Wakelin	Hector Ruiz	AB	CK	HH	ET	Total Hours	Labor Total
	PD	QA/QC	CAM	PM	APM	TL	TL	TL	AM	Support	Support	Support	Support		
	$255	$214	$255	$235	$140	$177	$164	$164	$235	$140	$106	$164	$117		
Task 1: Asset Categorization		5		40	68	72	80	15	10	190	176	250	330	1236	$175,515
Task 2: Risk Prioritization Plan	2.5	10		82	29.5	52	20	72	14	147	147	250	270	1096	$162,511
Task 3: Development of Capital Replacement Budget		5		16	20	24		16	10	40	40			171	$26,719
Task 4: CMMS Software Evaluation				8	8	32								48	$8,675
Task 5: Project Management	14.5	28.5	9	127	174	24	14		6					397	$74,179
Task 6: Development of Strategic Asset Management Plan	5	17	2	70	70	77	31	48	17	56	56			449	$76,067
Total Labor Hours	**22**	**65.5**	**11**	**343**	**369.5**	**281**	**145**	**151**	**57**	**433**	**419**	**500**	**600**		
Estimated Project Total	**$5,607**	**$14,002**	**$2,803**	**$80,639**	**$51,549**	**$49,858**	**$23,780**	**$24,764**	**$13,401**	**$60,750**	**$44,552**	**$82,000**	**$69,960**	**3397**	**$523,665**

Subconsultants

	Westberg and White					
	Support Staff	Owner	Senior Designer	Per Diem	Sub Markup	Total Subs
	$100	$245	$135	$100		
Task 1: Asset Categorization	188	2		19	$3,175	$24,340
Task 2: Risk Prioritization Plan	258		56	26	$5,394	$41,354
Task 3: Development of Capital Replacement Budget	42		32		$1,278	$9,798
Task 4: CMMS Software Evaluation						
Task 5: Project Management	16	12			$681	$5,221
Task 6: Development of Strategic Asset Management Plan	24	5			$544	$4,169
Total Labor Hours	**528**	**19**	**88**	**45**		**680**
Estimated Project Total	**$52,800**	**$4,655**	**$11,880**	**$4,475**	**$11,072**	**$84,882**

Expenses

Hotel	Rental Car/Night	Airfare	Submeter GPS	Mobile LiDAR	Per Diem (Meals and Misc. Travel)	Total Expenses	Task Total
$5,000	$750	$1,200	$1,050	$8,000	$1,200	$17,200	$217,054
$5,800	$625	$800	$1,050	$8,000	$900	$17,175	$221,040
							$36,517
							$8,675
$1,000	$125	$2,200			$500	$3,825	$83,225
$2,200	$438	$2,500			$1,350	$6,488	$86,723
$14,000	**$1,938**	**$6,700**	**$2,100**	**$16,000**	**$3,950**	**$44,688**	**$653,234**

08

Client Reference List

In order to more fully evaluate your background and experience for the project herein proposed, it is requested that you submit a list of references and/or similar projects completed or in progress within the last 24 months or as noted in the requirements of the RFP or IFB. Your cooperation in this matter is greatly appreciated.

Company Name: **GHD/Westberg & White**

Number of years as a contractor in the work of this type: **GHD 90+ years / Westberg & White 36 years**

Three projects/clients references for this type of work:

Client Name **Vallejo Flood and Wastewater District**
Address **450 Ryder St. Villego, CA**
Contact Name **Johnson Ho** Contact Email **jho@vallejowastewater.org**
Contact Phone Number **707-315-6291**
Project Description **The District embarked on a multi-year, phased Asset Management (AM) Implementation Program to develop and implement leading AM principles and practices.**
Project Start Date **2017** Project End Date **Ongoing**
Project Amount: **$859,000**

Client Name **Napa Sanitation District**
Address **1515 Soscol Ferry Road, Napa, CA 94558**
Contact Name **Robin Gamble** Contact Email **rgamble@napasan.com**
Contact Phone Number **707-258-6031**
Project Description **GHD first assisted NSD with an AM Program Implementation Roadmap. They are currently implementing that Roadmap with GHD's assistance.**
Project Start Date **2016** Project End Date **Ongoing**
Project Amount: **$315,000**

Client Name **Water Replemishment District of Southern California**
Address **4040 Paramount Boulevard, Lakewood, CA 90712**
Contact Name **Tom Knoell** Contact Email **tknoell@wrd.org**
Contact Phone Number **562-275-4266**
Project Description **GHD assisted WRD with an AM Master Plan, IT Master Plan, CMMS Selection and Implementation, and an AMP for a Pilot Advanced Water Treatment Facility.**
Project Start Date **2015** Project End Date **Ongoing**
Project Amount: **$1,050,000**

09

Modification, Changes or Exceptions to the City Contract of Service Agreement Template

→ Modification, Changes or Exceptions to the City Contract of Service Agreement Template

GHD requires no modifications, changes, or exceptions to the City's Contract of Service Agreement Template.

10

Required Forms

January 13, 2022

City of Carson
701 E. Carson Street
Carson, CA 90745

Re: GHD Proposal

Dear Sirs:

The undersigned, being the duly elected and qualified Secretary of GHD Inc., a California corporation (the "Corporation"), does hereby certify that by virtue of a Board Resolution adopted by the Board of Directors of the Corporation effective February 5, 2021, which resolution remains in effect as of the date hereof, and which resolution establishes job related authority levels, Simon Kaye, a GHD Business Group Leader and Vice President, is authorized to approve and execute proposals, contracts and agreements of up to $1,500,000 in value in the name and on behalf of the Corporation, and such execution of any proposals, contracts, agreements or obligations in the Corporation's name on its behalf by Simon Kaye under seal of the Corporation, shall be valid and binding upon this Corporation.

Be also advised that GHD Inc. is currently in good standing with the California Secretary of State.

Very truly yours,

GHD

J. Duncan Findlay, Esq.
Corporate Secretary and
Chief Counsel - Americas

4747 N. 22nd Street, Suite 200, Phoenix, Arizona 85016 USA
T 1 602 216 7200 F 1 602 216 7201 W www.ghd.com

FEDERAL LOBBYIST
REQUIREMENTS CERTIFICATION

Name of Firm: GHD Date: 1/13/2022

Address: 320 Goddard Way, Suite 200, Irvine

State: California Zip Code: 92618 Phone No.: (949) 648-5200

Acting on behalf of the above-named firm, as its Authorized Official, I certify as follows:

1. No Federal appropriated funds have been paid, by or on behalf of the above named firm to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of and Federal grant, loan or cooperative agreement, and any extension, continuation, renewal, amendment, or modification thereof, and;

2. If any funds other than Federal appropriated funds have paid or will be paid to any person for influencing or attempting to influence an officer or employee or any agency, a Member of Congress an officer or employee of Congress or an employee of a Member of Congress in connection with this Federal contract, grant loan, or cooperative agreement, the above named firm shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying", in accordance with its instructions, and:

3. The above-named firm shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreement) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into the transaction imposed by Section 1352 Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Authorized Official:

Name: Simon Kaye Title: Senior Vice President

Signature: Date: 1/13/2022

CITY OF CARSON
AFFIDAVIT OF NON-COLLUSION AND NON-DISCRIMINATION

I hereby swear (or affirm) under the penalty of perjury:

That the attached proposal or bid has been arrived at by the responder independently and has been submitted without collusion with and without any agreement, understanding, or planned common course of action with any other firm or entity designed to limit fair and open competition;

That the contents of the proposal or bid response have not been communicated by the responder or its employees or agents to any person not an employee or agent of the responder and will not be communicated to any such persons prior to the official opening of the solicitation responses; and

The proposer/bidder does not and shall not discriminate, will provide equal employment practices, and will adhere to an affirmative action program to ensure that in their employment practices, persons are employed and employees are treated equally and without regard to or because of race, religion, ancestry, national origin, sex, sexual orientation, age, disability, marital status or medical condition.

I certify that the statements in this affidavit are true and accurate.

Signature	1/13/2022 **Date**
Simon Kaye **Printed Name**	Senior Vice President **Title**

2019.05.08sh

CERTIFICATE OF COMPLIANCE WITH LABOR CODE SECTION 3700

Name of Firm: GHD

Acting on behalf of the above-named firm ("Consultant"), as its Authorized Official, I, the undersigned, certify as follows:

Consultant is aware of the provisions of Section 3700 of the California Labor Code, which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with provisions of that code, and will comply with such provisions before commencing the performance of the work under any contract awarded in response to Consultant's proposal.

CONSULTANT

By: Simon Kaye

Title: Senior Vice President
Date: 1/13/2022`

DEBARMENT AND SUSPENSION CERTIFICATION

Name of Firm: GHD

Acting on behalf of the above-named firm ("Consultant"), as its Authorized Official, I, the undersigned, certify as follows:

I am a duly authorized representative of ("Consultant"). Consultant certifies, to the best of its knowledge and belief, that Consultant, including its principals:

Is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any federal department or agency, and not does not have a proposed debarment pending;

Has not within the three-year period preceding this certification been convicted of or had a civil judgment rendered against it for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state or local) transaction, contract, or subcontract under a public transaction; for violation of federal or state antitrust statutes; or for commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements or receiving stolen property;

Is not presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, state, or local) with commission of any of the offenses enumerated in paragraph (2) above; and

Has not within the three-year period preceding this certification had one or more public transactions (federal, state or local) terminated for cause or default.

Consultant further certifies that Consultant, including its principals, is not listed on the government-wide exclusions in the System for Award Management.

Consultant acknowledges that falsely providing this certification may result in criminal prosecution or administrative sanctions, and that this certification is a required component of all proposals in response to this RFP/IFB.

A proposal that does not include a completed and signed version of this certification will be deemed incomplete and materially nonresponsive, and will not be considered.

CONSULTANT

By: Simon Kaye

Title: Senior Vice President

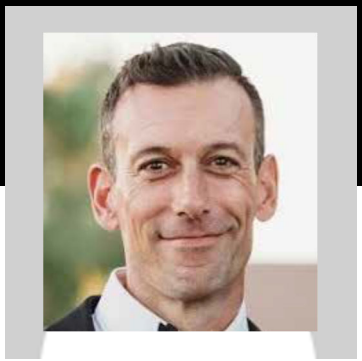
Date: 1/13/2022

Appendix A

Team Resumes

Ryan Johnson

Executive Advisor, Asset Management



Location
Irvine, Ca
–

Experience
15+ years

Key technical skills
– Public Works/Utilities Operations and Maintenance Management, TAMP, Transportation and Municipal Asset Management – Culture change – Asset Reliability Studies – Condition Assessment & Monitoring – Life Cycle Costing & Planning
CMMS and EAM systems development and implementation – Maintenance & Capital Planning – Reliability Centred Maintenance (RCM)

Relevant experience summary

Over 15 yrs of O&M Management and in the Water, Wastewater, Energy and Transportation-Public and Private sectors; with a focus on Asset Management and Maintenance Performance optimization in Public Works and Utilities. Uniquely experienced to develop Levels of Service, and whole of business goals from an Owner/Operator perspective, driving tailored solutions with attainable goals.

Performance-driven and respected Senior Leader; with an emphasis on Optimization, Asset Management Program Development, and Implementation projects. Thrives on driving organizational integrity and maintaining leadership oversight for strategic planning and execution standards while partnering with Clients in defining long-term program initiatives, goals, and objectives.

GHD

Carson, Ca -Facilities Maintenance Evaluation Project

Role: Technical Lead

Conducted Condition assessments, Risk assessment and CIP recommendation development of the City of Carson's HVAC and selected facilities.

Pleasanton, Ca CMMS Selection, and Implementation Project

Role: Client Manager

Facilitated CMMS selection, development and functional deployment of Public Works and inter-departmental CMMS system. Oversaw project, communication and ensured Client satisfaction with project

Port of Houston AM Project

Role: Asset Management Advisor/facilitator

Facilitated and conducted Asset Management GAP assessment, and industry best practices comparison project with worldwide leading Ports.

Jacobs

Role: Asset Management leader (Municipal and Commercial)
Client: 150+ wastewater and water projects
Location: Reno, Nv
Date(s): 2018 - 2021

Lead development and deployment of Asset Management policy, procedures and strategies across North American OMFS business. Provided Asset Management support for key Business Development pursuits; Proposal development, pricing and coaching - Consult and coach external clients in Asset Management strategies and implementations. Implement and drive Asset Management and Maintenance Culture across North American OMFS municipal, commercial and Federal Business.

Clients included City of Vancouver, Mayport Naval Station, North Miami Beach Water, The Villages

Major Projects included:

– **City of Vancouver AMP** (Asset Management Plan)
  - Project Manager
  - All WWTF's City of Vancouver, WA

- **Mayport Naval Station**, Facilities condition assessment and Strategic investment planning,
  - Project Advisor, Asset management
  - Mayport Naval Station, Jacksonville, Fl
- **NMB Water** AMP and CMMS implementation
  - Project Advisor, Asset management
  - North Miami Beach Water, Miami, Fl
- Corporate CMMS workflow and training development (143 North America Projects)

Veolia North America

Role: Sr. Director Asset Support North America
Client: 350+ Wastewater and Water O&M projects
Location: Boston, MA
Date(s): 2010-2018

Developed and supported Veolia Water's ongoing Asset Management Program, and O&M strategies for the North American Municipal and Commercial business; focusing on initiatives to improve their wastewater, water and storm-water asset management program, including treatment plants and lift stations. ♣ Drove all goals and objectives to improve the accuracy and integrity of data collected, developing processes and approaches for asset management and capital project work, and implemented advanced methods and tools to enhance existing programs. ♣ Developed and implemented geographic information system (GIS), computerized maintenance management (CMMS) and underground asset management (UGAM) maintenance tools and approach for use the North American Municipal and Commercial Business. ♣ Owned responsibility for leading the implementation of the company's RCM Training initiative across North America, while also achieving over $40M in savings through RCM studies over a period of 24 months.

Clients included New York City DEP, Washington Aqueduct and DC Water, City of Milwaukee, City of Chicago, PWSA (Pittsburgh Water and Sewer Authority) BP

Major Projects included:

- **New York City DEP** Wastewater Treatment Optimization Project
  - Asset Management Project Director
  - 13 WWTF in the Department of Environmental Protection
  - New York, NY
- **Washington Aqueduct and DC Water** Maintenance Optimization and Asset Management project,
  - Asset Management Project Director
  - Washington Aqueduct, Washington DC
  - DC Water, Washington DC
- **Pittsburgh Sewer and Water Authority** Water master planning and O&M optimization project
  - Project Director
  - Pittsburgh Sewer and Water Authority, Pittsburgh, Pa
- **Milwaukee Municipal Sewerage District (MMSD)** Asset Management Program development
  - Milwaukee and Jones Island WWTF, Milwaukee, Wi
- **BP (British Petroleum)** Whiting Refinery Reliability Project
  - RCM facilitator, Project Director
    - BP refinery, Whiting, In

GHD Advisory

A GHD Principal

Simon Kaye

North America Market Leader

Location

Irvine, CA USA

Experience

25 years

Qualifications/Accreditations

- Higher National Diploma
- Business Management
- Brunel University London, Uxbridge, England

Key technical skills

- Asset Management, Advisory and Change Management, Business Case / Commercial Focus, Operating Models and Organization Design, Supply Chain and Procurement Management, Cost Reduction and Business Improvement Initiatives Program and Project Management, Risk and Opportunity Management, Project, Client and Market Strategies

Relevant experience summary

Simon Kaye is a principal in GHD with over 25 years of experience providing technical and consulting solutions to clients across the public and private sectors in the UK, Europe, and North America. Simon specializes in leading strategic consulting engagements focused on mergers and acquisitions, project turnarounds, operational efficiency, and asset management to deliver clear project outcomes that are business case backed. Simon is part of the North America Advisory Leadership Team with a specific remit for driving team and delivery performance across all GHD advisory disciplines.

GHD Advisory

Advisory Market Leader – North America
North America | 6/2019 - Ongoing

Joined GHD in June 2019 and has taken on a leadership role with the GHD Advisory group with a specific remit and leadership for Advisory growth across North America aligned to the key markets for Water, Transportation and Environmental. The role to grow Advisory is aligned with supporting the growth of the GHD wider business across North America.

Arcadis

Technology Sector Leader, Technology Accounts Account Leader, Global Account Leader
North America | 1/2015 – 6/2019

Served as Technology Sector Leader in North America $25 million / growing at greater than 20% per annum. Fastest growing sector in Arcadis and specifically chosen to focus and double down on driving continued growth. Role focused on driving growth and creating a meaningful standalone market sector - grown from $12 million to $25 million in 12 months with strategy to grow to $50 million by 2021. Served as Technology Accounts Account Leader for delivering $20 million per GHD Advisory

Arcadis

Technology Sector Leader, Technology Accounts Account Leader, Global Account Leader
North America | 1/2015 – 6/2019

Served as Technology Sector Leader in North America $25 million / growing at greater than 20% per annum. Fastest growing sector in Arcadis and specifically chosen to focus and double down on driving continued growth. Role focused on driving growth and creating a meaningful standalone market sector - grown from $12 million to $25 million in 12 months with strategy to grow to $50 million by 2021. Served as Technology Accounts Account Leader for delivering $20 million per Global Account Leader for Global Multi-National with head office in North America delivering $5 million by end of 2017 with 20% year on year growth - 3 million

- Recruited and implemented sub-market leaders for aerospace, automotive, and conglomerates as part of strategy for growth

T (949) 858-5220 | **M** (949) 378-9759 | **E** Simon.Kaye@ghd.com **www.ghd.com**

EC Harris

Advisory West Coast Leader
North America (An Arcadis Company) | 1/2014 – 12/2014

As part of initial North America, team was responsible to grow advisory propositions on the West Coast. Integrate with Arcadis client teams to identify and land differentiated advisory propositions. Key successes:

- High Speed Rail – Part of Arcadis bid team specifically responsible for Strategy and Differentiated Propositions - $10 million
- PG&E Chromium Program – Designed the program operating model and strategy to deliver the business case and 50/50 cost sharing model - $300 million program
- American Express – Played a strategic role in implementing the separation of the Global Travel Business from AmEx Financial Services. Led Arcadis team on Project Management of new Amex Head Office in Florida - $200 million

EC Harris UK (an Arcadis Company - from 2011)

Management Consultant / Partner
3/2007 – 12/2013

- Partner in EC Harris UK, Ltd. and part of the Management Consulting leadership team - c. 80 people (Strategy and Transformation)
- Partner in charge of people development, resourcing and recruitment - managed team of 80 people
- Responsible for leading key private and public sector accounts across EC Harris such as Scottish Water GBP3m per annum
- Led key EC Harris commissions with responsibility for delivery and client relationship across several market sectors, transportation, water, commercial developers, manufacturing, retail banking and retail across the globe (UK, Europe, North America, Caribbean, and Australasia)
- Iconic Projects and Clients - Heathrow Terminal 5, High Speed Rail 1, St. Pancras Station Redevelopment, Dublin Light Railway, Grosvenor, Quintain, Hammerson, Tesco, National Australia Bank, and Scottish Water

EC Harris UK (an Arcadis Company - from 2011)

Management Consultant / Partner
3/2007 – 12/2013

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London Underground / Jubilee Line Extension

Commercial Manager
London, England | 8/1992 – 1/2001

- Jubilee Line Extension Project - GBP4bn extension of the Jubilee Line as part of the London Underground network
- Served as Commercial Manager for all the non-construction contracts - c. GBP200m
- Interfaced between project teams and executive on approval of projects changes across the whole project

Transformational Experience

- Scottish Water – Worked jointly with Scottish Waters and its Executive Board to design and implement its future state Asset Management and Capital Project delivery organization ($650 million per annum in Capex Spend) designed to make Scottish Water a top tier Water company in the UK. Project focused on full operating model re-design and transformation of the existing business to the future state for the next five-year regulatory period whilst continuing to deliver the existing program.
- High Speed Rail – Worked jointly with London and Continental Railways to create the operator organization to manage the High-Speed Rail and transition of Eurostar from Waterloo to St Pancras. Created the operator organization for the $5 billion High Speed Rail link between London and Paris and then led the transition of the railway from a CapEx project to successful go live operations.
- Dublin Light Railway – Seconded to the Railway Procurement Agency (RPA) to create the operator organization and transition from Capex to Opex of the Dublin Light Railway. RPA was a new organization created to deliver the Dublin Light Railway and I led the team that worked with RPA to create the operations part of the organization, procure, and implement the operator and maintenance contractors and manage the transition from Capex to Opex of the first light rail system in Dublin, Ireland.
- Grosvenor – Designed and implemented with Grosvenor a supply chain partnering strategy that

enabled Grosvenor to deliver its capital program more efficiently and enabled them to be more successful in the acquisition of land in the Mayfair and Belgravia parts of London. Developed and implemented a capital delivery model that reduced construction schedule by greater than 10% and reduced cost by greater than 10% whilst ensuring that quality standards were maintained.

– Power Utility, California – Designed and implemented a Program Management Office to deliver a $350 million capital program delivering 20% cost and schedule efficiencies. Focused on full spectrum of the operating model from organization design to supply chain to internal and external communications to create the appropriate environment for the Power Management Office to be successful.
– Alabama Water – Worked as a joint team to identify and implement transformational change that improved efficiency of the agency and focused on improving deliver performance and public perception.

Career history

2019 - present	GHD, Executive Advisor
2015 - 2019	Arcadis, Senior Vice President
2014 - 2014	EC Harris North America (Arcadis Company), Partner
2007 - 2013	EC Harris UK (Arcadis Company), Partner

Jeffrey Berk, PE

Client Affairs Manager

Location

Irvine, CA

Experience

30+ years

Qualifications/Accreditations

- BS, Civil Engineering, California Polytechnic State University, Pomona 1988
- MS, Environmental Engineering, Loyola Marymount University, Los Angeles, CA 1993

Memberships

- American Society of Civil Engineers (ASCE)
- American Public Works Association (AWWA)

Relevance to the project:

Jeff Berk, with 30 years of experience, is a nationally recognized professional civil engineer dedicated to leadership, strategic planning, project delivery, and committed client relationships. He is responsible for ensuring GHD's corporate commitment for large-scale, multi-disciplined engineering and management projects throughout California. Jeff's management responsibilities include committing the best resources to support client and project goals, including both local staff and global experts. His involvement includes ensuring client expectations are met and that GHD's ISO-certified quality management procedures are followed.

Jeff Berk has broad experience in infrastructure planning, engineering design, construction, and research. He has helped large agencies address their business and engineering challenges. His professional achievements as a principal-in-charge are reflected in his numerous multi-million-dollar assignments, including projects for the City of Los Angeles Bureau of Sanitation, Los Angeles Department of Water and Power, Orange County Sanitation District, and San Francisco Public Utilities Commission.

Project experience

Chairman of the Joint Venture Board Sewer System Improvement Program
Role: Chairman
Client: San Francisco Public Utilities Commission
Location: San Francisco, CA

The Sewer System Improvement Program is a 20-year, multi-billion-dollar citywide investment to upgrade aging sewer infrastructure to ensure a reliable and seismically safe sewer system. It will upgrade grey infrastructure for reliability and regulatory compliance; implement innovative green infrastructure projects; and protect the health of the community and environment. Served as Chairman of the Joint Venture Board and was ultimately responsible for resource management, quality control, and meeting milestones.

OSCD, Various Projects
Role: Principal-in-Charge, Project Manager
Client: Orange County Sanitation District (OSCD)
Location: Orange County, CA

The OSCD is a public agency that provides wastewater collection, treatment, and disposal services for approximately 2.5 million people in central and northwest Orange County. OCSD has two operating facilities that treat wastewater from residential, commercial and industrial sources. Served as Project Manager or Principal-in-Charge on several significant projects at both facilities, including P1-101 Dewatering and Odor Control project and J-112 Ocean Outfall Booster Pump Station Evaluation. As Principal-in-Charge, responsible for managing the financials of multiple projects, resource management, quality control, and client satisfaction.

City of Los Angeles, Various Projects
Role: Principal-in-Charge, Project Manager, Contract Manager
Client: City of Los Angeles, Bureau of Sanitation
Location: Los Angeles, CA

With an annual budget of over $260 million, the Los Angeles Bureau of Sanitation collects, cleans and recycles solid and liquid waste generated by residential, commercial and industrial users in the City of Los Angeles and surrounding communities. Over the past 30 years, served as Project Manager or Principal-in-Charge on numerous projects, including the Enhanced Watershed Management Plan for Ballona Creek and Los Angeles River, the Terminal Island Treatment Plant Dewatering Expansion project, and the Hyperion Treatment Plant Digester Screening Facility. Also, the Contract Manager for the Los Angeles Bureau of Sanitation On-Call contract and was responsible for client satisfaction, resource management, and quality control.

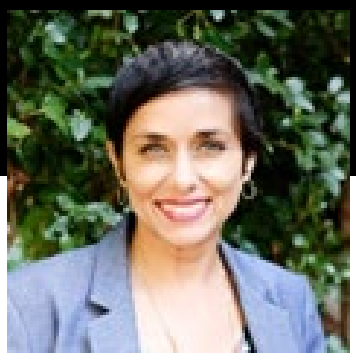
City of Los Angeles, Various Projects
Role: Principal-in-Charge, Project Manager, Contract Manager
Client: City of Los Angeles, Various Projects
Location: Los Angeles, CA

The Los Angeles Bureau of Engineering is the City's lead agency for the planning, design and construction management of public buildings, infrastructure and open space projects. Over the past 30 years, has been Project Manager or Principal-in-Charge on numerous projects including the Argo Drain Sub Basin Facility and several large projects at Hyperion Treatment Plant, Terminal Island Treatment Plant, and Donald C. Tillman Treatment Plant. Also Contract Manager for the Los Angeles Bureau of Engineering On-Call contract and was responsible for client satisfaction, resource management, and quality control.

GHD Advisory

Meha Bola MSc, BSc

Senior Advisor



Location

Irvine, CA USA

Experience

20+ years

Academic Experience

- Master of Science in Organizational and Social Psychology, 2019
- Master of Science in Environmental Engineering, 2001
- Bachelor of Science in Civil and Environmental Engineering, 1998

Key technical skills

- Infrastructure and technology asset management
- Strategy and organizational/operating model design
- Organizational transformation, behavioral change, cultural change, and change management
- Business process design and improvement
- Stakeholder engagement

Certificates, accreditation, memberships

- Global Association of Applied Behavioral Scientists
- Design Thinking for HR and Talent Leaders

Narrative on the relevant experience

Meha's work on asset management includes transportation, water, and solid waste infrastructure assets and technology assets, and spans the asset lifecycle. She is experienced in strategy and governance, organizational change, business process improvement, and technology selection and implementation for public and private clients across the globe. Meha uses a wide range of skills, including facilitation, training, coaching, management, and mentoring to help organizations meet their most pressing business challenges.

Infrastructure Asset Condition and Risk Assessment

Role: Project Manager
Client: City of Carson
Location: Carson, CA United States
Project value: $50,000
Date(s): 2020

At the request of the new Director of Public Works, Meha managed the condition and risk assessment of critical municipal facilities to estimate budget requirements for coming fiscal year.

Work included a desktop assessment of assets and budgets, site assessment of selected infrastructure, and facilitation of workshops to review recommendations.

Technology Asset Management Plan

Role: Facilitator and Project Manager
Client: Region of York
Location: York, ON Canada
Project value: $88,000
Date(s): 2020

For the fast-growing Region of York, Meha provided technical guidance during development of their first ever Technology Asset Management Plan, in compliance with Ontario Regulation 588/17.

Support included guidance on risk management, best practices benchmarking, performance measurement, continuous improvement, and overall program implementation.

Public Works Organizational Assessment

Role: Project Manager
Client: City of Carson
Location: Carson, CA United States
Project value: $20,000
Date(s): 2021

At the request of the City Manager, conducted a rapid assessment and benchmarking of proposed changes to structure and roles of Department of Public Works. Work included desktop assessment of roles and responsibilities compared to industry best practices and comparable cities, and analysis of alignment with City's strategy and priorities.

Digital Transformation Assessment

Role: Principal Management Consultant
Client: Confidential
Location: London, United Kingdom
Project value: Confidential
Date(s): 2018

In support of a digital transformation initiative, Meha assessed the effectiveness of the strategy and organizational structure for senior executives of confidential library client through interviews and workshops. She identified internal roadblocks in defining authority, responsibility, and communication of decision-making.

Meha implemented recommendations which resulted in streamlining its decision-making processes, enabling progress on critical projects.

Infrastructure Asset Management Program

Role: Community Engagement Consultant and Facilitator
Client: US Environmental Protection Agency
Location: Hagåtña, GU United States
Project value: Confidential
Date(s): 2011 - 2014

On behalf of the U.S. Environmental Protection Agency, Meha provided support to the Guam Waterworks Authority, which was out of compliance with federal environmental regulations and could not build or maintain infrastructure according to commitments made to regulators. She facilitated workshops with utility staff to gain consensus on improvements to procedures covering capital improvement program planning, cost estimating, procurement, contract administration, construction management, construction inspection, and asset management.

Meha developed a change management approach and coached utility staff to begin implementation of new procedures. The Client successfully implemented procedures, satisfying regulators with progress made, and avoided going into receivership.

Infrastructure Asset Management Program

Role: Facilitator and Business Process Improvement Consultant
Client: Albuquerque Bernalillo County Water Utility Authority
Location Albuquerque, NM United States
Project value: Confidential
Date(s): 2012 - 2013

To support the implementation of a Computerized Maintenance Management System for their infrastructure asset management program, Meha facilitated a series of workshops with supervisors and staff of the Albuquerque Bernalillo County Water Utility Authority.

She reviewed workflows, collected feedback, and gained consensus on recommendations for processes to implement. Implementation of recommended workflows resulted in improvements to efficiency and performance.

Infrastructure Benchmarking Program

Role: Benchmarking Consultant
Client: Metropolitan Water District of Southern California
Location: Los Angeles, United States
Project value: Confidential
Date(s): 2003 - 2013

For the $1.5B+/yr Metropolitan Water District of Southern California, the largest wholesale water agency in the U.S., Meha provided support to address criticisms about the inefficiency of infrastructure project delivery from the member agencies who are also their customers. She designed a benchmarking program to convene representatives of large water agencies to contribute data to evaluate project delivery costs, best practices, and staffing levels to improve efficiency and effectiveness.

Meha identified and solicited participation of 30 representatives of 11 large water agencies; researched and prepared project case studies; prepared surveys on cost reporting methods, project phasing, and project costs; and created workshop materials. She managed development of a custom website; oversaw data collection, vetting, and analysis.

This work resulted in development of a new mathematical model to describe project delivery costs.

Collaboration was so successful that the participating agencies agreed to repeat the initial 1-year project cycle for 10 more years.

Jennifer Dustin, CAPM

Advisor

Location

Charlotte, NC

Experience

15 years

Qualifications/Accreditations

- Certified Associate of Project Management, Project Management Institute — 2013
- B.A., Business Technology Administration, University of Maryland Baltimore County — 2008

Memberships

- Project Management Institute

Relevance to the project:

Jennifer has 15 years of experience in financial, administrative, and project management roles with more than five years focused on asset management in the fields of water, facilities and transportation. Specific experience includes business process mapping, CMMS systems integration including Cityworks and Lucity, condition assessment, workshop facilitation, and the development of technology solutions to assist and streamline processes and procedures.

Project experience

EAMS Implementation

Role: CMMS Configuration Support
Client: Town of Ajax
Location: Ajax, ON
Date(s): 2020 - Present

Ms. Dustin has assisted with the configuration of Cityworks for multiple business units, as well as managing and maintaining the issues log, while resolving those issues efficiently and effectively.

CMMS Selection and Implementation

Role: Support
Client: South Coast Water District
Location: Laguna Beach, CA
Date(s): 2020 - present

Assisted with the requirements gathering associated with the selection and implementation of a CMMS for SCWD, including a comprehensive review of the existing technology and data and Business Process Mapping. Supported the overall selection of Enterprise AM System, including documenting requirements, RFP writing, development of an implementation plan, vendor demonstration setup, assistance with system selection, licensing and contract negotiations.

CMMS Implementation

Role: Project Support
Client: Department of Water
Location: Syracuse, NY
Date(s): 2019 - present

Assisted with designing and developing the water treatment plant asset register; CMMS system configuration; implementing Storeroom, including process mapping which clearly indicates statuses and roles to minimize duplicate work effort, reduce overall inventory size and subsequent costs and streamline material flow, importing key suppliers of materials for quick order turn-around, kitting and staging of materials for work orders in advance; creating comprehensive training materials and role specific “cheat sheets” easy reference materials; and end user training for desktop and mobile users.

Enterprise AM System/AM Plan Integration

Role: Project Support
Client: Westchester County Department of Environmental Facilities
Location: New Rochelle, NY
Date(s): 2005 - present

Assisted with mapping the fields from the Asset Management Plan to the existing InforEAM system to determine whether to utilize the InforEAM RCM module or create custom fields and screens to accommodate data. Supported configuration, including asset hierarchy, work order templates, and reporting as new assets are brought online at any of the multiple wastewater treatment plants.

CMMS Assessment
Role: Project Support
Client: New Braunfels Utilities
Location: New Braunsfels, TX
Date(s): 2019 - present

As part of developing a Strategic Asset Management Plan for New Braunfels Utilities how the organization is utilizing their maintenance management systems. The outputs of the assessment are being incorporated by staff. Future phases of the work will include asset register development, mobiletechnology implementation and other system improvements.

CMMS Audit and Selection
Role: Project Support
Client: Elsinore Valley Municipal Water District
Location: Lake Elsinore, CA
Date(s): 2019 - present

CMMS Audit. Supported the performance of a CMMS evaluation which assessed maintenance business process effectiveness and the potential need for updates; the CMMS configuration and its capability to support best in class maintenance practices; database development including the nature of the asset records and preventive maintenance program in general; clarity around roles and responsibilities with respect to maintenance planning, tracking and reporting; and proposed an Implementation strategy for recommendations including restructure of the asset hierarchy.

EAMS Selection. Assisted with the requirements gathering associated with the selection and implementation of an EAMS for EVMWD, including a comprehensive review of the existing technology and data and Business Process Mapping. Provided direction and schema design assistance for formalizing the asset register for the new EAMS.

CMMS Audit and Selection
Role: Assistant Project Manager/Project Support
Client: City of West Sacramento Public Works Department
Location: West Sacramento, CA
Date(s): 2019 - 2020

Assisted the requirements gathering associated with the selection and implementation of a comprehensive CMMS solution for the Public Works Department for the City of West Sacramento. Tasks included a comprehensive review of the existing technology, data and leading Business Process Mapping workshops. Provided direction and schema design assistance for formalizing the asset register for the new CMMS.

CMMS Needs Assessment and Business Process Mapping
Role: Project Support
Client: Department of Water
Location: Syracuse, NY
Date(s): 2018

Assisted with workshops with key staff to determine organization wide CMMS readiness and provided recommendations for Asset Management Strategy. Assisted with business process mapping workshops whose results will serve as blueprints for CMMS configuration.

CMMS Selection & Implementation Oversight
Role: Assistant Project Manager
Client: Moulton Niguel Water District
Location: Laguna Hills, CA
Date(s): 2017 - 2018

Helped lead the assessment of current procedures and industry best practices, including the review of existing systems and technology and Business Process Mapping, preparation of a Request for Proposal for a CMMS Implementation; assistance with the selection process; and associated services encompassing the extent of the CMMS Planning project.

CMMS Selection and Implementation
Role: Project Support
Client: Napa Sanitation District
Location: Napa, CA
Date(s): 2018 - 2021

Assisted with the requirements gathering associated with the selection and implementation of a CMMS for Napa Sanitation District, including a comprehensive review of the existing technology and data, and Business Process Mapping. Supported the selection of a computerized maintenance management system (CMMS) including documenting requirements, technical and functional specifications, RFP development, and system selection.

CMMS Selection and Implementation
Role: Project Support
Client: Department of Public Works
Location: Plymouth, MI
Date(s): 2017 - 2019

Assisted with requirements gathering associated with the selection and implementation of a CMMS for the Charter Plymouth Township Department of Public Works. Supported selection of a computerized maintenance management system (CMMS) including business process mapping, documenting requirements, the development of technical and functional specifications, RFP development, assistance with system selection, licensing, and contract negotiations. Assisted with the development of an Implementation Roadmap, which included both a test plan and training plan as well as a GIS Implementation Plan for improving the overall GIS. Supported CMMS configuration on hosted environment.

Asset Management System Implementation for Water Reclamation Facility
Role: Technology Consultant
Client: Department of Public Utilities
Location: Salt Lake City, UT

Assisted with the system design and configuration, including the creation of work orders and asset types.

Enterprise Asset Management System Implementation for the Department of Utilities and Engineering, Metro Wastewater Treatment Plant
Role: Technology Consultant
Client: Department of Utilities & Engineering
Location: Columbia, SC

Assisted with designing and developing plant asset registers; developing the asset hierarchy for GIS object relationships; geodatabase architecture, design, and deployment.

PipeSafe Process Analysis
Role: Facilitator, Business Process Mapping and Development
Client: South Central Connecticut Regional Water Authority
Location: New Haven, CT

Workshop Facilitation: Facilitated a 2-day workshop to identify deficiencies in the SCCRWA PipeSafe process, design a new process, and plan its implementation. Documented all stages of the process and provided that documentation to the client in a usable format.

Process Mapping
Role: Technology Consultant
Client: Potash Corporation of Saskatchewan
Location: Multiple, USA and Canada

Developed process maps for all environmental reporting processes at three different facilities across North America. Developed functional requirements document to guide the client through selecting an environmental compliance management system for corporation-wide use.

Asset Management Program
Role: Technology Consultant
Client: Vallejo Sanitation & Flood Control District
Location: Vallejo, CA

Developed condition assessment database for tracking of scores and images related to condition assessment of assets. Developed management strategy group's database to facilitate the reporting and editing of management strategy groups.

Asset Management Plans
Role: Asset Management Consultant
Client: City of Rehoboth Beach
Location: Rehoboth Beach, DE

GHD is assisting Rehoboth Beach by developing an asset management plan for their wastewater and water assets. The project involves developing the asset register, asset condition assessment and asset consequence of failure scoring systems.

Asset Management Program
Role: Asset Management Consultant
Client: Capital Region Water
Location: Harrisburg, PA

GHD is assisting CRW to develop an asset management framework for their wastewater and water assets. The project involves developing the asset management framework and implementation strategy, asset condition assessment and asset consequence of failure scoring systems.

Sustainable Asset Management Program
Role: Asset Management Consultant
Client: Madison Metropolitan Sewerage District
Location: Madison, WI

This project includes the development of a sustainable asset management (SAM) framework and implementation plan for the District. The framework is based on the US EPA's 5 Core Questions and includes condition, levels of service, risk and business case analysis elements. The project is now in the implementation phase.

Amber Shows

Location Intelligence Team Lead

Location

Eureka, CA

Experience

14 years

Qualifications/Accreditations

– GISP, Geographic Information Systems Certification Institute, 2021
– MS, Natural Resource Science, Humboldt State University, Arcata, CA, 2014
– Graduate Certificate, Geospatial Sciences, Humboldt State University, Arcata, CA, 2013
– BS, Biology, Environmental Studies and French, Northern Arizona University, Flagstaff, AZ, 2004

Key technical skills

– Esri Desktop and Online software suite

Memberships

– North Coast Geographic Information Systems User Group

Relevant experience summary

Amber Shows is a Geographic Information Systems Professional and Project Manager with 14 years of experience in the spatial sciences, mobile mapping (GPS), asset inventory, and watershed and environmental management. She has experience with managing spatial and non-spatial data, mobile mapping, and surveying on private and public lands, building and maintaining geodatabases, remote sensing and analysis, preparation of grant proposals, regulatory agency coordination, and field work ranging from aquatic to public utility. Amber possesses a diverse educational and professional background, making her a valuable asset to any project where spatial sciences and data management are required.

Del Norte Regional Transportation Mapping

Project Manager
Del Norte Local Transportation Commission | Crescent City, CA

This project standardized County, City, and Tribal roadways, transit, and active transportation layers in GIS within Del Norte County. Coordinated the gathering of data and schema structure and guided the spatial and attribute editing to achieve an accurate and dependable GIS system for the stakeholders in Del Norte County.

Fishing Grounds WebMap

Project Manager
Humboldt Fishermen's Marketing Association | Eureka, Humboldt County, CA

In partnership with the Humboldt Fishermen's Marketing Association, the University of California, Santa Cruz, and the California Ocean Protection Council, GHD gathered, standardized and digitized the results of stakeholder input on commercial fishing grounds for the North Coast of California. By providing this GIS data to a public data clearing house and presenting it as a public facing interactive WebMap, Humboldt Fishermen's Marketing Association is able to tell their story and provide valuable insight to a wider audience in an easily accessible format.

City of Sonoma Retroreflectivity Assessment

GIS Analyst
City of Sonoma | Sonoma, CA

As part of their SSAR, the City of Sonoma in California hired GHD to complete an identified mitigation measure to ensure road signage met retroreflectivity standards. Received the City's signage GIS data, made it available to field staff via the ArcGIS Online Collector app, then analyzed, merged, and delivered the data back to the City in its original format. Coordinated and supported this month-long field project and provided the client an end product that helped them visualize and plan for maintenance work, keeping drivers safe in their community.

City of Carson NPDES Facility Inspections and Database Development

GIS Analyst
City of Carson Department of Public Works | Carson, CA

Responsible for the digital development of a facility inspection data collection program designed to meet the requirements of the Los Angeles County National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit around stormwater mobilization of contaminants. Project components included: development of an iPad/WebGIS tracking system, field form and quality assurance/quality control (QA/QC) protocols; and field facility inspectors' guidance, support and training. Over 1,100 facilities were inspected for illicit discharges, use of best management practices (BMPs) and general housekeeping.

General Plan Update and Specific Area Plan: 3D Urban Planning Model

GIS Analyst
City of Arcata | Arcata, Humboldt County, CA

Working with Planwest, GHD modelled City zoning and planning rules and several development scenarios in a 3D environment for the City of Arcata's General Plan Update and Specific Area Plan Element. Leveraged ArcGIS Urban to easily build, analyze and share development scenarios and their effects on housing and jobs created as well as anticipated demands on resources and greenhouse gas emissions.

City of Sebastopol Water and Wastewater Mapping

GIS Analyst
City of Sebastopol | Sebastopol, CA

Coordinated the initial development of a water and sewer GIS for the City of Sebastopol. This project entailed the conversion of CAD modelling results and as-built drawings into data-rich GIS layers for utility maintenance staff and master planning and Clean in Place (CIP) development. Coordinated the process and the implementation of data development, field data collection with real-time survey grade GPS, and integration into the City's asset management software via regional partners and ESRI's Enterprise ArcGIS environment.

City of Elk Grove Systematic Safety Analysis Report (SSAR)

GIS Analyst
City of Elk Grove | Elk Grove, CA

The City of Elk Grove worked with GHD to develop a SSAR to provide analytics-based traffic improvements that address the underlying risk factors that are able to be addressed through engineering and design. Contributed to this process by building a spatial analysis tool within the ESRI environment that ranks intersections and roadways based on several risk factors. As risk factors are addressed, the tool reflects the decreased risk at those locations and allows City staff to turn their focus on the remaining high priority locations.

City of Anaheim Fee Study

GIS Analyst
City of Anaheim | Anaheim, CA

The City of Anaheim requested an evaluation of their stormwater fee structure based on land use and impervious surface ratios. GHD analyzed the City's high resolution multispectral imagery using remote sensing and image classification software to provide an updated impervious/pervious surface layer. Created an accuracy assessment of the results utilizing random points and multiple editors to determine error rates per land use designation. This exercise provided the confidence the City needed in adjusting their fee schedule based on the new impervious surface results.

Windsor Sewer Master Plan - Phase 3

Mobile GIS and Asset Inventory Lead
Town of Windsor | Windsor, CA

In her capacity as Mobile GIS and Asset Inventory Lead, prepared equipment, data, and field work, and conducted four weeks of field work, then post-processed data for a sewer manhole depth and condition inventory. Highly accurate GPS equipment allowed this data to be used for modelling the gravity sewer system and to be used as the basis for master planning by the Town. Was successful in debuting a new piece of GPS equipment that greatly improved accuracy and efficiency in the field. The goal of this project was to assist the Town in planning capacity for projected growth.

National Pollutant Discharge Elimination System (NPDES) Permit Renewal Assistance

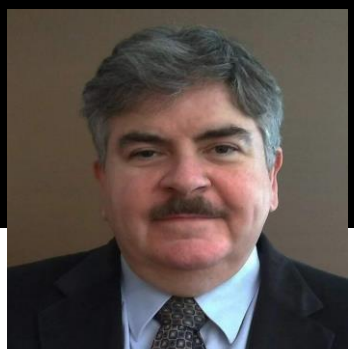
Asset Inventory Lead
Mendocino Department of Transportation | Mendocino County, CA

Acted as the Asset Inventory Lead for the Mendocino Department of Transportation NPDES Permit Renewal Assistance project. The project involved the creation of a custom data entry system satisfying both the permit renewal and the asset management aspects of the project, then the mapping of MS4 stormwater facilities surrounding the incorporated communities of Ukiah and Fort Bragg and resulted in the creation of stormwater system maps and an asset management system for Mendocino Department of Transportation's future use.

GHD Advisory

Bradley Wakelin B.A.Sc.

Senior Advisor – Asset Management



Location

Waterloo, Ontario, Canada

Experience

30 years

Qualifications/Accreditations

– Bachelor of Applied Science (Civil Eng.) with Management Science Option, 1992

Key technical skills

– Project Management, Software Implantation, Business Analysis, Pavement Management

Relevant experience summary

Brad has worked with over 40 Public Works Organizations to design, develop, and implement systems for Infrastructure Management. This has included Asset Management for Roads, Water, Wastewater, Sewer, Parks, Facilities, Signs, Bridges, Sidewalks, Trees, Streetlights, Street Furniture, Guardrails, and Signals. The organizations he has worked with include all levels from municipal, provincial, and federal including China and Romania. He has worked with all aspects of implementing systems from start to finish, in teams and independently and is able to successfully discuss implementation details with business and technical teams.

Brad has extensive experience with Business Process Review including Asset Management Planning, Business Requirement Documents, Graphical User Interface design, system prototyping, User Acceptance Documentation and testing and database development with Oracle, Microsoft SQL Server, and MS Access. He was responsible for the Design, Development and Implementation of Asset Management and Work Management Software Systems including hardware specification, data conversion, and training.

Rate Mobile Rating Application for ROW and Pavement Inventory

Project Manager
Los Angeles County | Los Angeles, California, USA

This project involved the development and implementation of the rRate Mobile Rating Application This is an iPad-based system which allowed for the digitizing of the County's current paper-based methodology for pavement condition field inspections. The system provides a streamlined and integrated pavement condition survey process for the County, while embracing and integrating with the County's current RoadMatrix and GIS systems.

Pavement, Signs, and Work Management System Implementation

Project Manager
Town of Caledon | Caledon, Ontario, Canada

Brad was the Project Manager and Implementer for the township's Asset and Work Management Implementation. He was responsible for reviewing and documenting the work management process and determining the data requirements and processes for using the system. This involved Business Process Review meetings with all groups involved including Finance. This also involved setting up the Citizen Service Request Management System.

Parks, Facility, and Signal Management System Implementation

Project Manager
City of Leduc | Leduc, Alberta, Canada

Brad was the Project Manager and Implementer for the City's Asset and Work Management Implementation related to Parks, Facilities and Signals. He was responsible for reviewing and documenting the work management process and determining the data requirements and processes for using the system. This involved Business Process Review meetings with all groups related to the above assets.

Pavement, Signs, and Work Management System Implementation

Project Manager
Town of Caledon | Caledon, Ontario, Canada

Brad was the Project Manager and Implementer for the township's Asset and Work Management Implementation. He was responsible for reviewing and documenting the work management process and determining the data requirements and processes for using the system. This involved Business Process Review meetings with all groups involved including Finance. This also involved setting up the Citizen Service Request Management System.

Parks, Facility, and Signal Management System Implementation within the Cartegraph Software

Project Manager
City of Leduc | Leduc, Alberta, Canada

Brad was the Project Manager and Implementer for the City's Asset and Work Management Implementation related to Parks, Facilities and Signals. He was responsible for reviewing and documenting the work management process and determining the data requirements and processes for using the system. This involved Business Process Review meetings with all groups related to the above assets.

Enterprise Asset and Work Management System Implementation for the Roads, Water, Sewer, Solid Waste, and Capital Planning Groups

Project Manager/Implementer
District Municipality of Muskoka | Muskoka, Ontario, Canada

Brad was the Project Manager and Implementer for the District's Asset and Work Management Implementation. He was responsible for reviewing and documenting the work management process and determining the data requirements and processes for using the system. This involved Business Process Review meetings with all groups involved including Finance. This system allows the District to manage their assets and work involved with maintaining and supporting the assets for which the District is responsible.

Enterprise Asset and Work Management System Implementation for Roads, Utilities, Pump Stations, Water Distribution, and Facilities, including Ontario One Call Support

Project Manager/ Implementer
Loyalist Township | Loyalist, Ontario, Canada

Brad was the Project Manager and Implementer for the Township's Cartegraph Asset and Work Management Implementation. He was responsible for reviewing and documenting the work management process overseeing the data loading for the project. This involved Business Process Review meetings with all groups involved including Finance. This system allows the District to manage their assets and work involved with maintaining and supporting the assets for which the District is responsible. He also setup the component required for managing the citizen requests and created a form for managing the Ontario One Call requests.

Cartegraph Asset and Work Management System Implementation for Water and Transportation / Implementation of RIVA Decision Support Software for Integrated Capital Planning

Project Manager/Business Analyst/Designer/ Implementer
City of Brandon | Brandon, Manitoba, Canada

Brad was the Project Manager and Implementer for the City's Asset and Work Management Implementation. He was responsible for reviewing and documenting the work management process and determining the data requirements and processes for using the system. This involved Business Process Review meetings with all groups involved including Finance. This system allows the City to manage their assets and work involved with maintaining and supporting the assets for which the City is responsible. He was also involved in implementing the RIVA Decision Support Software and facilitated the integration with the Cartegraph asset components.

Enterprise Asset and Work Management System Implementation for the Transportation and Solid Waste Groups, including Service Request Management

Project Manager/Implementer
St. Clair Township | St. Clair, Ontario, Canada

Brad was the Project Manager and Implementer for the township's Asset and Work Management Implementation. He was responsible for reviewing and documenting the work management process and determining the data requirements and processes for using the system. This involved Business Process Review meetings with all groups involved including Finance. This also involved setting up the Citizen Service Request Management System.

Requirements Analysis and RFP Management for an Enterprise Asset and Work Management System

Business Analyst
Buffalo Pound Water Treatment Plant | Stoney Beach, Saskatchewan, Canada

The water treatment plant supplies all water for the Cities of Regina and Moose Jaw. They wanted to upgrade their current asset and work management system including improved inventory control. Brad completed an analysis of the current systems and documented potential improvements. He then created the RFP for the plant, supervised the review of the submitted proposals and managed the proposal meetings and review process for the plant. This led to the selection of the ideal candidate for the software system and implementation.

Asset Project Cost Estimating Process Review and Analysis

Business Analyst
City of Ottawa | Ottawa, Ontario, Canada

The City wanted to review their project cost estimating process for all groups including Roads, Water, Bridges, Parks and Facilities. Brad set up meetings with each group, reviewed and documented their processes. He also compared these processes with other municipalities. This led to a report of the processes and recommendations for the City.

Pavement Distress and Roughness Data Collection and Cartegraph Pavement Management System Implementation

Implementation Specialist
City of Kingston | Kingston, Ontario, Canada

Brad implemented the City's Pavement Management System using the Cartegraph Software. This included setting up the data and updating the analysis parameters. He also created a calculator for the distress index based on the Ministry of Transportation, Ontario (MTO) rating system.

Cartegraph Pavement Management System Implementation

Implementation Specialist
City of Guelph | Guelph, Ontario, Canada

Brad implemented the City's Pavement Management System using the Cartegraph Software. This included meetings to define the business practices related to pavement management, setting up the data and updating the analysis parameters.

Pavement Management System Conversion Project

Project Manager/Implementer
City of Ottawa | Ottawa, Ontario, Canada

The City upgraded their existing Municipal Pavement Management Application (SuperPMS) to Stantec's RoadMatrix pavement management system. Brad was responsible for the conversion of the historical Pavement Quality Index (PQI) data, decision trees, treatment activities and unit rates, maintenance activities, and existing operating parameters to RoadMatrix. Brad also provided RoadMatrix support.

Pavement Management System Implementation Project

Project Manager/Implementer
City of Mississauga | Mississauga, Ontario, Canada

The City implemented the Stantec's RoadMatrix pavement management system. Brad was responsible for the conversion of the asset data from the Hansen system, and created the operating parameters for RoadMatrix. Brad also provided RoadMatrix support.

Pavement Distress and Roughness Data Collection and Cartegraph Pavement Management System Implementation

Implementation Specialist
City of Kingston | Kingston, Ontario, Canada

Brad implemented the City's Pavement Management System using the Cartegraph Software. This included setting up the data and updating the analysis parameters. He also created a calculator for the distress index based on the Ministry of Transportation, Ontario (MTO) rating system.

Pavement Distress and Roughness Data Collection and Pavement Management System Implementation using the Cartegraph Software

Implementation Specialist
City of Detroit | Detroit, Michigan, USA

This project involved setting up the pavement management system for the City and loading the data collected by our project partner. Brad was responsible for discussing the analysis parameters with the client, setting up the system, completing the integration with the GIS and training the client on its use.

Pavement Management System Conversion Project

Project Manager/Implementer
City of Toronto | Toronto, Ontario, Canada

The City upgraded their existing Municipal Pavement Management Application (MPMA) to Stantec's RoadMatrix pavement management system. Brad was responsible for the conversion of the historical Pavement Quality Index (PQI) data, decision trees, treatment activities and unit rates, maintenance activities, and existing operating parameters to RoadMatrix. Brad also provided RoadMatrix support.

Cartegraph Pavement Management System Implementation

Project Manager/Implementer
Campbell County | Campbell County, Wyoming, USA

This project involved setting up the pavement management system for the County. Brad was responsible for reviewing and updating the analysis parameters with the client, setting up the system, completing the integration with the GIS and training the client on its use. He was also involved in reviewing and setup of the decision trees and deterioration curves with the client.

Pavement Distress and Roughness Data Collection and Cartegraph Pavement Management System Implementation

Implementation Specialist
Clark County | Clark County, Nevada, USA

This project involved setting up the pavement management data for the system including the Distress and Roughness data. This was collected and processed using our automated field data collection vehicles.

Cartegraph Pavement Condition Data Collection and Pavement Management System Implementation

Project Manager/Implementer
City of Gillette | Gillette, Wyoming, USA

This project involved setting up the pavement management system for the City. This also included creating a manual data collection system for collecting the distress data. Brad was responsible for reviewing and updating the analysis parameters with the client, setting up the system, completing the integration with the GIS and training the client on its use. He was also involved in reviewing and setup of the decision trees and deterioration curves with the client.

Pavement Management System Implementation Project

Software Implementation Support
York Region | York Region, Ontario, Canada

The Region implemented the Stantec's RoadMatrix pavement management system. Brad was responsible for the system and database setup including integrations with ArcGIS. Brad also provided RoadMatrix support.

Career history

2021 - present	GHD, Senior Advisor – Asset Management
2018 - 2020	Self-Employed, Enterprise Asset Management Consultant
2014 - 2018	Stantec Engineering, Software Development Manager and Pavement Management Team Leader
2001 - 2013	Applied GeoLogics Inc., Business Analyst/Senior Implementation Specialist
1994 - 2001	Stantec Engineering, Software Developer/Implementation Specialist

GHD Advisory

Ryan Stotz M.A., B.S.

Enterprise Asset Management Systems Advisor

Location
Buffalo, NY, USA

Experience
11+ years

Qualifications/Accreditations
– M.A. Geography Geographic Information Systems Science, 2012
– B.S. (Honors), Environmental Science, 2009
– Certification, Mendix Rapid Application Developer, #23106
– RCM Facilitator

Memberships
– American Water Works Association (2011 – present)
– New York State Geographic Information System (GIS) Association (2011 – present)

Relevant experience summary

Ryan's background in GIS kicked off his career as an Asset Manager working with a municipal water project. From there, Ryan took on a new role to support numerous projects across North America focusing on asset management, CMMS and reliability. Over the past decade he has worked with projects including water, wastewater, incineration, energy production and distribution, and other environmental services. Ryan is a subject matter expert of a variety of CMMS solutions and Customer Information Systems.

Project Coordinator

Senior Advisor
Buffalo Water Board | Buffalo, NY,USA | 2021 – present

Responsibilities include developing processes and procedures related to specialized projects such as customer assistance programs and lead service line modelling. Overseeing the RFP process and implementation of a new CIS and FWOM (Field Work Order Management) system.

CMMS Asset Tagging and Standardization

Senior Advisor
East County Joint Powers Authority | Santee, CA, USA | 2021

Responsibilities include integrating asset management principles into the design and construction process so that asset management data is collected, analyzed, and leveraged to build the necessary information needed for CMMS. Assign equipment tag numbers and/or asset location identification numbers for each asset type, and develop a mechanical tag equipment list with all associated asset attribute data for each asset type.

CMMS Asset Register and Hierarchy

Senior Advisor
South Coast Water District | Laguna Beach, CA, USA | 2021

Responsibilities include developing an asset register and hierarchy to be used in CMMS and GIS, developing a schema and relationship classes for linear and vertical assets.

CMMS On-Call Advisor

Senior Advisor
South Central Connecticut Regional Water Authority | New Haven, CT, USA | 2021 – present

Responsibilities include providing on-call services to improve business processes, configuration of Infor EAM, and leveraging a mobile workforce.

EAMS Technical Lead

Senior Advisor
W.L. Gore & Associates | Elkton, MD, USA | 2021 – present

Responsibilities include providing technical lead services including collaborating with the Client to improve their hierarchy, asset register development, Infor EAM configuration, and KPI development.

EAMS Implementation

Senior Advisor
City of Ajax | Ajax, ON, CA, USA | 2021 – present

Responsibilities include developing to-be process mapping in both Microsoft Visio and accompanying annotation documentation. Developed reporting using Crystal Reports to be used in Cityworks.

CMMS Oversight

Senior Advisor
Oneida County | Oneida, NY, USA | 2021 – present

Responsibilities include reviewing operations and maintenance manuals to build the asset register and reviewing/updating the plant equipment asset hierarchy and preventive maintenance task lists.

CMMS Support, Asset Management, and Reliability Specialist

CMMS User Support Technician
Veolia North America | Various | 2015 – 2021

Clients included:

- Municipal water and wastewater including New York City DEP, Milwaukee Metropolitan Sewerage District, Detroit Water and Sewerage Department, City of New Orleans and Buffalo Water Board.
- District energy solutions in Boston, Baltimore, Kansas City and Philadelphia.
- Georgia Renewable Power in Lumberton, NC, Franklin County, GA and Madison County, GA.
- Incineration facilities including Sauget, IL, Gum Springs, AR and Port Arthur, TX.
- Brooklyn Navy Yard (Maximo implementation from MP2)

Asset Management and Site Safety

Asset Manager and Site Safety Coordinator
Veolia North America | Buffalo, NY, USA | 2011 – 2015

Responsibilities included managing the small meter replacement program consisting of the changeout of over 20,000 meters. Coordinated with contractor on data exchange including meter attributes, photos for before and after replacement, updates to customer information. Developed GIS routing solution for meter reading optimization. Trained City staff on new meter reading software and devices.

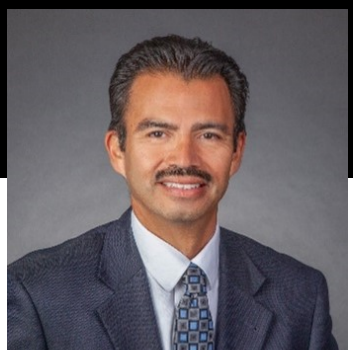
Career history

2021 - present	GHD, Senior Advisor
2015 - 2021	Veolia, CMMS User Support Technician
2011 - 2015	Veolia, Asset Manager

[Choose an option...]

Hector Ruiz PE, MS

Executive Advisor



Location

Irvine, CA

Experience

33 years

Qualifications/Accreditations

- MS, Civil and Environmental Engineering and Science, 1992
- BS, Civil Engineering, 1990
- California Registered Civil Engineer

Key technical skills

- Utility management, administration, and governance
- Utility and treatment plant operations and maintenance
- Asset management, risk management, and strategic planning

Memberships

- American Water Works Association, California-Nevada Section, Engineering Division Chair (2020/2021), Vice Chair 2018/2019)
- Association of California Water Agencies, Leadership Essentials for the Water Industry, Alumni
- Institute of Asset Management

Relevant experience summary

Hector Ruiz has more than 30 years of experience in utility management and engineering, including planning, design, construction, and operation of improvements and upgrades to water/wastewater/storm water systems. Hector's experience with utility management includes working side-by-side with engineering, planning, legal counsel, finance, maintenance, and operations personnel on business workflows and process mapping, conducting gap assessments, implementing Computerized Maintenance Management Systems (CMMS), developing condition assessment protocols, developing Asset Management (AM) plans, developing short-term and long-term investment profiles, and conducting business case evaluations.

Hector's experience in the public sector includes the oversight and management of water and wastewater treatment personnel and facilities for a public agency in Orange County, California where he served as the General Manager and District Engineer. Hector brings his experience from the public sector of having worked for many years with regulators, engineers, operators, and maintenance technicians in effectively managing an agency's operation, finances, security, and infrastructure and as such, understands the value of utility management from an owner's perspective.

Project experience

Utility Management – Public System

Managed the Trabuco Canyon Water District, a California public water utility with a five-member, publicly elected Board of Directors providing retail water, wastewater, and recycled water services.

Hector was overall responsible for the management of assets for the agency's water/wastewater/recycled water facilities and infrastructure including a wastewater treatment and recycling plant, a surface water treatment plant, a groundwater treatment plant, several miles of water transmission and distribution mains, several miles of gravity and force mains, water and sewerage pump stations, water storage reservoirs, and various pressure reducing stations and two open reservoirs with earthen dams. In managing its recycled water system and supplies, Hector worked in supplementing recycled water supplies through the capture, treatment, storage, and reuse of urban runoff.

Hector worked closely with legal, finance, engineering, operations, and maintenance departments in the preparation of the agency's budget, CIP, rates, and reserves, and contracts/agreements with other public agencies.

Project Manager
Asset Management (AM), Risk & Resiliency

Assessment (RRA) | Water Facilities Authority | Upland, CA

Served as Project Manager for the development of an Asset Management Plan (AMP) for use with providing the Authority with short and long-term investment profiles for asset renewal and replacement that relies less on age and more on true asset condition and risk. The AMP was used to recommend reserve amounts for its member agencies (City of Chino, City of Chino Hills, City of Ontario, City of Upland, and Monte Vista Water District).

GHD conducted several on-site and online AM sessions and workshops, covering topics on developing an asset register, condition assessments, and Consequence of Failure (CoF) and Probability of Failure (PoF), and risk management. In addition, the asset register developed for the AMP was prepared to serve a dual purpose for use in procuring a new CMMS and for easier upload to the future CMMS. GHD also updated the Authority's Risk Resiliency and Assessment Plan in compliance with America's Water Infrastructure Act of 2018. Currently the Water Facilities Authority is in the process of implementing the various AM initiatives and best practices.

Project Manager
AM System Evaluation and Implementation Plan | South Coast Water District (SCWD) | Dana Point, CA

Served as Project Manager for SCWD's AM System Evaluation and Implementation Plan (AM Roadmap) and new strategy for replacing its CMMS. SCWD provides full retail services in water, wastewater, and recycled water to approximately 35,000 residents, 1,000 business, and draws over two million visitors annually to the coastal and inland communities it serves. GHD worked with SCWD to document workflows and develop business process maps, evaluate and assess CMMS software solutions, and identify leading best practices and initiatives in AM for the District. The AM Roadmap is intended to identify and guide the district's future investments in technology, asset data collection, system integration needs, and the development of risk-based project planning and prioritization. The AM Roadmap is also intended to identify initiatives that increase and retain institutional knowledge through asset management, training, and capabilities development of staff and processes across SCWD's various departments and services.

Project Manager
On-Call AM Services | Metropolitan Water District of Southern California | Southern California

Served as Project Manager for providing as-needed AM planning services to the Metropolitan Water District of Southern California. GHD has been working with Metropolitan as an advisor with a focus on facilitating workshops and performing reviews for the continued development of Metropolitan's AM program. GHD worked closely with Metropolitan's engineering, operations, maintenance, and AM staff in development of a Strategic AM Plan and in identifying leading best practices in AM. GHD facilitated several workshops (on-site and online) on various topics and areas of practice in AM including data management, information technology, maintenance management, assessing Gaps, condition assessments, asset criticality, and review of asset hierarchy and register development.

AM Advisor
Enterprise AM Strategy | Inland Empire Utilities Agency (IEUA) | Chino, CA

Served as AM Advisor for the development of the IEUA Enterprise AM Strategy. A Gap Assessment was conducted by GHD in following with ISO 55001 guidelines that included facilitating workshops and working closely with IEUA's engineering, O&M, business services, and CMMS staff in development of an overall AM strategy. In conducting the Gap Assessment, GHD facilitated several workshops on various topics and areas of practice in AM including data management, information technology, maintenance management, condition assessments, AM policy, and AM governance. IEUA has begun implementing various initiatives identified in the AM strategy, including an AM policy, AM governance, spare parts strategy, AM ready specifications, and the maintenance optimization of its collection system.

Project Manager
Specific Tasks for Development of a Comprehensive AM Plan | Elsinore Valley Municipal Water District (EVMWD) | Elsinore, CA

Served as Project Manager for the EVMWD Development of a Comprehensive AM Plan. GHD worked closely with the EVMWD to implement leading best practices in AM, specifically preparing risk prioritization plans and asset categorization registers for linear and representative vertical assets. Utilizing data from Geographic Information System (GIS), CMMS software, and the collection system program, Granite, GHD worked with EVMWD to develop risk-based investment profiles for its water distribution system, gravity sewer system, and a representative lift station and water booster pump station. GHD worked with EVMWD to develop risk profiles that applied a rating system using CoF and PoF for use in preparation of capital replacement budgets (short-term and long-term investment profiles). GHD performed an assessment of EVMWD's CMMS system and developed a set of functional requirements for use in procurement of an upgraded or new CMMS system. Over the course of the project, GHD facilitated approximately twenty technical sessions or workshops with staff from planning, engineering, operations, and maintenance. From these sessions, valuable insight and direction from EVMWD staff was obtained and used to prepare a Roadmap that

identified key AM initiatives and leading best practices for further development of EVMWD's AM Program.

Task Lead/ AM Advisor | Groundwater AM Plan | San Jose Water Company (SJW) | San Jose, CA

SJW is an investor-owned public utility and is one of the largest and most technically sophisticated urban water systems in the United States. SJW has a service area with over one million people in the greater San Jose metropolitan area. SJW has been developing an AM program with an initial focus on critical assets including their wells, reservoirs, and pump stations. SJW engaged GHD to provide AM advisory services in support of their developing AM Program and produce a Groundwater AM Plan for use with over 90 wells and 17 well stations within their service area. As an advisor, Hector worked with GHD's lead technical AM leadership in preparing the Groundwater AM Plan with specific focus on preparing a business case evaluation for wellhead treatment and developing Level of Service (LOS) scoring criteria for water quality parameters. A scoring system that included regulated and non-regulated parameters was developed and used in assessing the wells along with other failure categories that included mortality, capacity, lost production, health and safety, and aesthetics. The Groundwater AM Plan included core risk and business risk exposure analysis that will be used in determining well operation, well performance monitoring and inspection, well rehab, or removing a well from service.