# Performance Audit of the Engineering Division

# GRANTS PASS, OREGON

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# 1. INTRODUCTION AND EXECUTIVE SUMMARY

This draft document is the performance audit report for the City of Grants Pass Engineering Division. This first chapter provides an introduction and an executive summary of the report. This summary identifies the information and approach used in this study and delineates key findings, conclusions and recommendations.

## 1. INTRODUCTION

The Matrix Consulting Group was retained by the City of Grants Pass to perform a study of Engineering Division operations. This report provides the Matrix Consulting Group's efforts related to this audit. Our analysis focused on a wide range of operational findings, conclusions and recommendations.

Specifically, the scope of work for this project is detailed in several chapters, which include:

- An executive summary as shown in this chapter.
- A profile chapter describing general operational characteristics of the Engineering Division.
- A best management practices chapter comparing the Engineering Division against a variety of best practice operations.
- An external customer service survey chapter identifying perceived strengths and opportunities for improvement.
- Two operational chapters discussing the findings, conclusions and recommendations with respect to the Engineering Division.

To develop this analysis the Matrix Consulting Group conducted an extensive number of interviews, performed comparative analysis and collected various data in an

effort to develop an understanding of Engineering and supporting City operations. Examples of data collection efforts included the following:

- Interviews with an extensive number of staff to include executive managers, supervisors, leads, and line staff.
- Collection and review of data from a wide range of sources including budgetary information, personnel data, workload information, etc.
- Review of key documents including capital project related information, payroll information, etc.

The following section provides a summary of the major findings and conclusions of this study.

## 2. EXECUTIVE SUMMARY

The following table summarizes the primary improvement opportunities identified by the Matrix Consulting Group in the analysis of the Engineering Division. The table prioritizes a list of recommendations to be implemented over both the short and long term ranging from higher priority (critical) to lower priority (desirable).

| Page # | Recommendations | Priority | Timing | Lead |
|---|---|---|---|---|
| 46 | Recommendation: Implement a comprehensive five-year Capital Improvement Program consistent with the City's Financial Policies and framed by key process steps noted in this chapter. This should be led by Public Works and the Engineering Division in partnership with the City's Finance Department. | Critical | FY 11/12 | Engineering / Public Works / Finance |
| 53 | Recommendation: Develop more robust capital project budget estimating to avoid cost overruns and enhance project cost estimating. Training should be provided that is consistent with the AACE Total Cost Management Framework. | Necessary | 4Q FY 11/12 | City Engineer |

| Page # | Recommendations | Priority | Timing | Lead |
|---|---|---|---|---|
| 57 | Recommendation: Re-design Engineering Division project time tracking to include ASCE task categories noted in this report and eliminating such generic time tasks as "Administration," "Miscellaneous," and "General Research" which appear overused. These ASCE tasks can be augmented but tasks should be informative as to what duties and responsibilities are accomplished. | Necessary | 3Q FY 11/12 | City Engineer |
| 64 | Recommendation: The Engineering Division should prepare a Design Authorization project plan before the commencement of the design of a capital project. | Critical | 1Q FY 11/12 | City Engineer |
| 66 | Recommendation: Formalize through a documented procedure a decision-making process for determining use of in-house staff versus private consultant on engineering design projects. | Necessary | 2Q FY 11/12 | City Engineer |
| 66 | Recommendation: Formalize through a documented procedure how design and other engineering consultant are selected. Provide criteria for selection with formal weightings for each criterion. Maintain formal scoring/selection sheets of hired consultants in project files. | Necessary | 3Q FY 11/12 | City Engineer |
| 67 | Recommendation: The Engineering Division should prepare a resource loaded project schedule for all of the capital projects that will be designed and inspected during that fiscal year. | Necessary | 1Q FY 11/12 | City Engineer |
| 69 | Recommendation: Implement a 24-month capital project Gantt Bar Chart with milestone highlights to facilitate capital project planning. Update these products quarterly. | Necessary | 1Q FY 11/12 | City Engineer |
| 73 | Recommendation: The Engineering Division should utilize more formal cost of construction guidelines (e.g. ASCE) to determine the staffing requirements for each capital improvement program project in terms of person hours required for design and construction inspection. | Critical | 1Q FY 11/12 | City Engineer |
| 75 | Recommendation: The project engineering staff assigned to the design of a project should complete a design report for each significant and complicated capital improvement project when the design is no more than 10% complete. | Necessary | 2Q FY 11/12 | City Engineer |
| 76 | Recommendation: The Engineering Division should prepare a periodic capital improvement program project status report. | Necessary | 1Q FY 11/12 | City Engineer |

| Page # | Recommendations | Priority | Timing | Lead |
|---|---|---|---|---|
| 76 | Recommendation: The periodic capital improvement program project status report should be updated and posted to the City's web site. | Desirable | 2Q FY 11/12 | City Engineer |
| 78 | Recommendation: The Engineering Division should prepare a final "lessons learned" project close-out report. | Critical | 2Q FY 11/12 | City Engineer |
| 79 | Recommendation: The Engineering Division should prepare a consulting engineer project close-out rating sheet. | Desirable | 2Q FY 11/12 | City Engineer |
| 79 | Recommendation: The Engineering Division should prepare an "in-house" engineer project close-out rating sheet. | Desirable | 2Q FY 11/12 | City Engineer |
| 81 | Recommendation: Implement the variety of Project Management practices identified in this report to either augment or replace existing Engineering project management methodologies. | Critical | FY 11/12 | CD Director / City Engineer |
| 83 | Recommendation: The Engineering Division should develop application guides for each of its engineering permits including grading permits, parcel maps, tract maps, public improvement plans, etc. that are readily available in easy to read formats. The Engineering Division should publish and prominently display the engineering permit application guides to its web site. | Desirable | 2Q FY 11/12 | City Engineer |
| 84 | Recommendation: The Engineering Division should publish on a regular basis "Client Assistance Memos" to its web site and e-mail these Client Assistance Memos to consulting engineers and contractors that subscribe to these documents. | Desirable | 3Q FY 11/12 | City Engineer |
| 85 | Recommendation: The Engineering Division should provide training to consulting engineers and developers regarding its engineering permit submittal requirements. | Necessary | 4Q FY 11/12 | City Engineer |
| 85 | Recommendation: The Engineering Division should provide feedback and assistance after each submittal when consulting engineers are involved in the development of the application and when they encountered particular problems meeting submittal requirements. | Necessary | 2Q FY 11/12 | City Engineer |
| 85 | Recommendation: Given existing Engineering development review performance, maintain the present Development Review fixed fee charges for plan check activities. | Desirable | FY 11/12 | City Engineer |
| 88 | Recommendation: Revisit methods for recording employee time by "project category" in the Engineering Division, monitoring both leave usage, and use of "General Utility" and "Other" time category utilization. | Necessary | 1Q FY 11/12 | City Engineer |

| Page # | Recommendations | Priority | Timing | Lead |
|---|---|---|---|---|
| 91 | Recommendation: In the long-term hire another entry-level professional engineer position to augment skill sets within the Engineering Division. | Desirable | Unk. | City HR |
| 92 | Recommendation: Seat an ad-hoc committee of Public Works and Community Development staff to help facilitate an effective transition that will help determine the specific steps necessary to fully re-engineer how such an engineering services transition from the Community Development Department to the Public Works Department should be accomplished. | Desirable | 1Q FY 11/12 | CD Director / PW Director |
| 95 | Recommendation: Provide 40 hours of training to Engineering Division staff on an annual basis. Ensure at minimum 75% of this training is dedicated to skill set development associated with engineering-related practices. | Critical | 1Q FY 11/12 | CD Director |
| 95 | Recommendation: Complete annual performance evaluations on all Engineering Division staff positions each calendar year. Incorporate into the evaluations desired key competencies and recommended training regimens. | Necessary | On-going | City Engineer |
| 98 | Recommendation: Continue to use outsourced engineering services to augment in-house Engineering operations. Fully outsourced engineering is not warranted. | Critical | On-going | City Engineer |
| 99 | Recommendation: Upon noted process improvements, use the American Society of Civil Engineers and Association of Professional Engineers and Geoscientists workload guidelines to develop engineering and inspection staffing estimates for various CIP projects and the Engineering Division overall. This should be accomplished within the next 12-18 months. | Critical | 3Q FY 11/12 | CD Director / PW Director |
| 99 | Recommendation: Maintain existing staffing levels in the Engineering Division in the short term. | Necessary | On-going | City Engineer |
| 106 | Recommendation: Formal “Billability” targets should be established for staff of the Engineering Division to help monitor performance. | Necessary | 4Q FY 10/11 | CD Director / PW Director |
| 106 | Recommendation: Specific and fixed fees for service should be charged for all Engineering services, and the budgetary requirement to fund the Engineering Division through “time and materials” payments eliminated. There are excellent fixed fee for service models that can be emulated including the State of Louisiana’s CDBG Program. | Critical | 1Q FY 11/12 | CD Director / PW Director |

| Page # | Recommendations | Priority | Timing | Lead |
|---|---|---|---|---|
| 106 | Recommendation: Update Engineering (and other City fees) on a regular basis based upon the fully-loaded cost of conducting business. Loaded costs should be fundamental to a fee-based cost recovery model. | Necessary | On-going | Finance Director |
| 106 | Recommendation: Eliminate the Internal Services Fund model for the Engineering Division and fund the Division through annual appropriations from relevant funding sources (e.g. utilities, general fund, road tax, etc.). | Necessary | 4Q FY 10/11 | Finance Director |
| 107 | Recommendation: Purchase approximately six (6) licenses of Microsoft Project software for the Engineering Division at an estimated $600 per license. Continue exploring upgrade of the H.T.E. legacy software. | Necessary | 1Q FY 11/12 | CD Director |
| 111 | Recommendation: The Division should re-invent its performance measurement system using the principal concepts noted in this section. There are numerous professional journals, articles, training sessions, and books on performance measurement. | Necessary | 1Q FY 11/12 | City Engineer |
| 111 | Recommendation: The Division should be held accountable for fully implementing a performance measurement system in their organization and should be held accountable for regular reporting of results. This information should be shared, in report format, with the City Manager, and perhaps the Council, on a quarterly basis. | Necessary | 4Q FY 10/11 | City Engineer |
| 111 | Recommendation: In the revision of the performance measurement system the Division should properly define and use outputs and outcomes with the intent to capture outcomes as often as possible. | Necessary | 4Q FY 10/11 | City Engineer |
| 113 | Recommendation: The Engineering Division should develop a capital improvement project procedures manual. | Necessary | 1Q FY 12/13 | City Engineer |
| 113 | Recommendation: The Engineering Division should develop an on-line capital improvement project management guide. | Desirable | 4Q FY 11/12 | City Engineer |

# 2. PROFILE OF THE ENGINEERING DIVISION

The chapter, which follows, provides a descriptive profile of the Grants Pass Engineering Division's operations within the Community Development Department.

## 1. INTRODUCTION

The Grant's Pass Engineering Division operation is responsible for a variety of services largely surrounding support of civil-based developer projects and internal Capital Improvement Program initiatives. The purpose of the descriptive profile is to document the project team's understanding of the organizational structure, allocation of staff, and principal assigned roles and responsibilities of staff. Data contained in the profile were developed based on the work conducted by the project team including:

- Interviews with all staff within Engineering.
- Interviews with partnering managerial staff in other departments in Grants Pass.
- Interviews with a variety of Engineering customers including line staff in public works, utilities services, etc.
- Various data collection efforts.

The descriptive profile does not attempt to recapitulate all organizational and operational facets of the Engineering Division. Rather, the profile reflects our understanding of the organization based upon initial data collection efforts, which is foundational for issues identification and analysis. In this report, the structure of this descriptive profile is as follows:

- Engineering organizational structure.
- Description of staff positions, by classification, and description of appropriate reporting relationships.

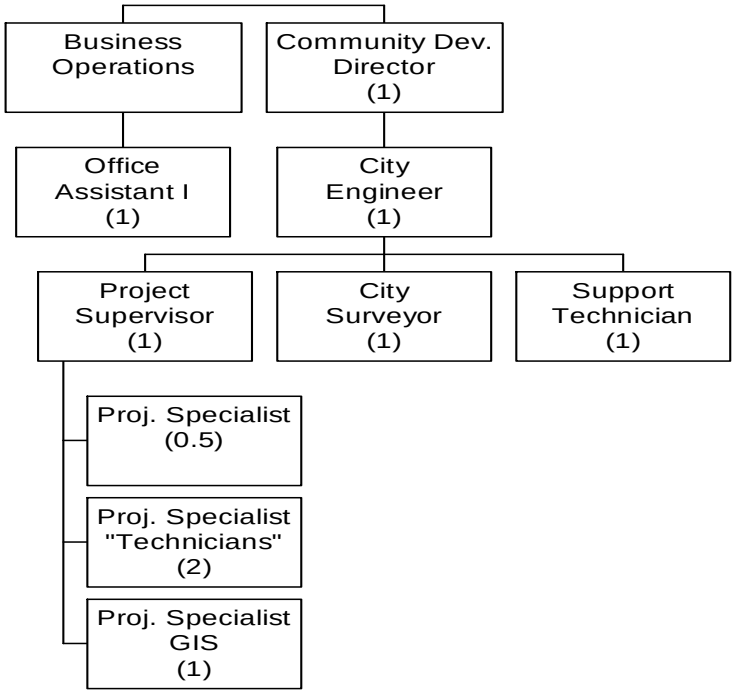
- Summary descriptions of key roles and responsibilities of staff. The responsibility descriptions provided in the Descriptive Profile also summarize the team's understanding of the major programs and service activities to which staff are currently assigned. It should be clearly noted that responsibility descriptions ***are not*** intended to be at the "job description" level of detail. Rather, the descriptions are intended to provide the basic nature of the job and including deployment, work schedules where appropriate, major duties and responsibilities, and the like.

As part of the interactive process, these data were reviewed for accuracy and completeness by the CDD management, Project Steering Committee and appropriate Engineering Supervision.

A revision of this profile product will serve as an introductory chapter in the report. This deliverable will be followed by a best management practices chapter identifying some of the Division's strengths and opportunities for improvement when juxtaposed against various operational best practices. A revision of this product will also become a chapter in the report.

## 2. ENGINEERING ORGANIZATIONAL PROFILE

The following provides an overview of the organizational structure of the Engineering Division and relevant reporting/support relationships. This includes current actual staffing levels in parentheses.




## 3. STAFFING

In the table, which follows, is a summary of the organizational units, staffing, and key elements of how staff are scheduled and deployed.

| Unit / Position(s) | No. of Positions | | Responsibilities |
|---|---|---|---|
| | Auth. | Cur. | |
| **COMMUNITY DEVELOPMENT ADMINISTRATION** | | | |
| Community Development Director | 1.0 | 1.0 | • The Community Development Director reports directly to the City Manager and is responsible for various operations within the Department.<br>• Directly supervises four divisions including Engineering, Planning, Building, and Business Operations.<br>• The Director provides managerial oversight of the functions associated with the four divisions, including supervision, planning, budgeting, reporting, community interface, etc. |
| **BUSINESS OPERATIONS** | | | |

| Unit / Position(s) | No. of Positions | | Responsibilities |
|---|---|---|---|
| | Auth. | Cur. | |
| Office Assistant I | 1.0 | 1.0 | • The Office Assistant I position works in the Business Operations Division supporting the entire Community Development Department; however, major emphasis is placed on assisting the Engineering Division.<br>• Provides operational support 8:00 a.m. to 5:00 p.m. Monday through Friday.<br>• Processes pre-qualification applications for contractors to include insurance and business license verification, CCB status, etc. Includes maintaining such webpage.<br>• Conducts bid openings.<br>• Processes notarized letters of approval.<br>• Performs special assignments such as aggregate rock quarry certifications.<br>• Assists in erosion control mailing and database maintenance.<br>• Performs accounts payable functions for CDD and Engineering Division supply ordering.<br>• Maintains the Engineering website.<br>• Scans various documents and maintains Mylar as-builts.<br>• Provides back-up to other staff, provides front counter support and performs other duties as assigned. |
| **ENGINEERING DIVISION** | | | |
| City Engineer | 1.0 | 1.0 | • Provides supervisory and managerial oversight over the Engineering Division. Reports directly to the Community Development Director.<br>• Provides direct supervision of three direct reports including the project supervisor, city surveyor and support technician.<br>• Ensures division operates under an internal service fund philosophy; prioritizing operational decisions framed by this financing protocol.<br>• As Engineering's only P.E., signs all engineering documents and performs various engineering projects of varied technical complexities.<br>• Prepares and manages the division's budget; plans various work; approves Change Orders; regularly reports upon various division operations; interfaces with other departments and the City Council; interfaces with the developer community and other citizens.<br>• Attends site plan review meetings and creates conditions for land use decisions.<br>• Scopes and reviews traffic impact studies.<br>• Reviews drainage plans for development.<br>• Performs special projects, including preparing designs for capital improvements, as assigned. |

| Unit / Position(s) | No. of Positions | | Responsibilities |
|---|---|---|---|
| | Auth. | Cur. | |
| Project Supervisor | 1.0 | 1.0 | • Provides supervisory oversight over most of the Engineering Division's technical staff. Reports directly to the City Engineer.<br>• Provides direct supervision of 3.5 staff to include all Project Specialist positions. Delegates work to these staff.<br>• Evaluates the 2-year and 5-year Capital Improvement Program project plans and prepares initial documents to facilitate scheduling of upcoming projects (e.g. bid specifications).<br>• Interfaces regularly with public works related to CIP project needs.<br>• Supports the front counter, informally rotating with specialist positions to provide technical answers to the public.<br>• Performs various in-house civil design work of minor projects using AutoCAD and other tools to include such projects as pedestrian trails, sidewalk designs, pavement projects, small sewer projects, etc.<br>• Participates, as necessary, in the Development Review process.<br>• Interfaces regularly one-on-one or in meetings with the community, other departments, surrounding jurisdictions (e.g. Josephine County), etc.<br>• Performs various project specialist tasks as needed.<br>• Performs special projects, as assigned. |
| Project Specialist (Technicians) | 2.0 | 2.0 | • Two (2) full-time Project Specialists provide various technical services, both reporting directly to the Project Supervisor.<br>• Performs all project inspection services for horizontal infrastructure (e.g. streets, pipelines) for both City Capital Improvement Program projects as well as private developer projects.<br>• Participates in preparation of project bid documents to ensure specifications meet various applicable standards, identify deviations, etc. Directs pre-bid meetings; participates in bid openings.<br>• Leads pre-construction meetings; performs project management and related inspections; facilitates change order and progressive payment approvals; and conducts project close-outs including, punch-list resolution, etc.<br>• Reviews plans in water, sewer, streets, etc. assigned as part of the Development Review Process.<br>• Facilitates processing of encroachment and other permits.<br>• Provides front counter assistance as "General Information Technician" from 3:00 p.m. to 5:00 p.m. on informal rotational basis.<br>• Performs special projects, as assigned. |

| Unit / Position(s) | No. of Positions | | Responsibilities |
|---|---|---|---|
| | Auth. | Cur. | |
| Project Specialist (GIS) | 1.0 | 1.0 | • One (1) full-time Project Specialist provides largely computerized technical support, reporting directly to the Project Supervisor.<br>• Creates and maintains 70% of the City's GIS layers utilizing ArcView.<br>• Works regularly with Business Operations database technicians to merge database information.<br>• Responds to custom mapping requests for internal and external customers.<br>• Performs minor civil design projects under oversight of Project Supervisor such as sidewalk projects.<br>• Performs numerous special projects to include sewer specifications update; bike lane inventory/mapping; update of standard drawings; MicroPaver database management and monitoring; stormwater and erosion control standards update.<br>• Periodically provides back-up to other Specialist positions including inspection services, front counter assistance, development review, permit issuance, etc. |
| Project Specialist (part-time) | 0.5 | 0.5 | • One (1) part-time Project Specialist provides various administrative/technical support services, reporting directly to the Project Supervisor. The position works 8:30 a.m. to 12:30 p.m. Monday through Friday.<br>• Tracks various developer projects through project management techniques using HTE and Excel software.<br>• Creates and maintains capital project schedules.<br>• Manages easement database.<br>• Tracks and maintains records of infrastructure to ensure GASB 34 compliance.<br>• Works with Project Supervisor to evaluate internal CIP project plans and prepares initial documents to facilitate scheduling of upcoming projects.<br>• Researches deferred development agreements for future project budgeting purposes.<br>• Performs traffic counts.<br>• Periodically performs field inspections and provides in-field support to Supervisor with respect to pre-design field review.<br>• Completes special projects, as assigned. |

| Unit / Position(s) | No. of Positions | | Responsibilities |
|---|---|---|---|
| | Auth. | Cur. | |
| City Surveyor | 1.0 | 1.0 | • One (1) full-time City Surveyor position provides a variety of services through varied duties and responsibilities. Reports directly to the City Engineer.<br>• Creates and maintains GIS-based information including infrastructure and parcel-mapping data.<br>• As licensed land surveyor performs numerous survey-based functions related to right-of-ways, road legalization and vacation, land boundaries, legal descriptions (e.g. for transfer documentation), in-field data collection, construction staking, field finishing of water/sewer/stormwater projects, etc.<br>• Performs various civil design projects under oversight of Project Supervisor using Civil3D and other methods.<br>• Manages final recording of UGB/sub-division plats (after review/red-lining), partitions, Records of Survey and oversees the Public Land Corner Preservation program.<br>• Performs special projects such as Request for Proposal development.<br>• Performs other duties and responsibilities, as assigned. |
| Support Technician | 1.0 | 1.0 | • One (1) full-time Support Technician position provides a variety of administrative and technical support services to the Engineering Division. Reports directly to the City Engineer.<br>• Maintains Capital Project files from inception to close-out including change order, progress payment, amendments, and other related documentation.<br>• Perform internal billing tracking and calculations for internal service fund purposes and ultimately forward to Finance.<br>• Input encroachment permits information into HTE.<br>• Support the City Engineer in developing and monitoring the division's budget.<br>• Process weekly invoices, including coding and acquiring appropriate signatures.<br>• Facilitate routing of all documents linked to the Development Review process, including external parties (e.g. State).<br>• Support preparation of professional service agreements, RFPs, etc.<br>• Manages Advanced Finance District (AFD) and Reimbursement District (RD) mechanisms to ensure funding/re-imbursement for developer and City installed infrastructure improvements.<br>• Other special projects, as assigned. |

# 3. BEST MANAGEMENT PRACTICES AND DIAGNOSTIC APPRAISAL

This chapter involves the diagnostic assessment of Grants Pass' Engineering Division operations. A diagnostic assessment is one of our auditing tools used by the project team to report operational findings and help identify important issues for further study. In order to make the assessments of operational strengths and improvement opportunities, the project team has developed a set of measures or "best management practices" (BMPs) against which to diagnose the organization. The best management practices noted in this chapter are:

- Statements of "effective practices" based on the study team's experience in evaluating operations in other cities or "standards" of the profession from other organizations such as the American Public Works Association, American Society of Civil Engineers, American Planning Association, etc.
- An Identification of whether the divisions meet the performance targets and if not, potential opportunities for improvement.
- Reflective of potentially broader issues deserving further analyses if common themes are discovered (e.g. incomplete use of information technology features).

It should be noted that agencies may not be able, or are unwilling, to implement a best practice for a variety of valid reasons. Best practices are not to be confused with standard practices, the latter of which should be considered mandatory while the former considered desirable[1]. Reasons for not pursuing a best practice include:

- Insufficient resources, whether personnel or fiscal, to adopt a best practice.
- Inadequate available time to proactively implement new practices due to priority focus on managing critical day-to-day issues such as significant community growth or economic crises.

[1] There is periodic argument among professional ranks as to whether a best practice is a standard practice and visa-versa.

- Insufficient support from political, executive, or managerial personnel to adopt a best practice.
- Inadequate buy-in from line staff to implement a best practice.
- Disagreement that the best practice, although successfully implemented in other agencies, would not be successful (for various cultural, organizational, or local/regional issues) in the agency under BMP review, and therefore is not a "best practice" from said agency's perspective.

Although there are relevant reasons, as noted above, to not implement an identified best practice, the ultimate intent should be to strive for implementing as many practices as feasible. The following best management practices are to provide the City with a framework from which additional operational improvements can be made as well as provide an outline of regularly occurring themes and possible issues to be focused upon in this Report.

## Exhibit – Best Practices Diagnostic Assessment

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| **Capital Projects Organization** | | |
| 1. All engineering design services provided by the City are centralized in one department to capture economies of scale. | In-house and consulting design services are managed out of the Engineering Division within Community Development. | The Public Works Department also manages design consultants bifurcating this engineering-related workload. |
| 2. The ratio of supervisory and support positions to line employees in Engineering is reasonable. | The ratio of supervisory to support staff is reasonable though at the lower end of the 1:6 to 1:11 scale; there is one manager, one supervisor and 6 personnel overseen. | |
| **Capital Projects Planning** | | |
| 3. A five-year capital improvement program has been developed and adopted by the City Council. | The City has several details with respect to capital programs in their GFOA awarded Adopted Operating & Capital Budget FY 10/11. The Public Works Department maintains a separate spreadsheet of planned capital projects for 5 years from FY 2011-FY 2015. | While details exist with respect to long-term capital improvement programs in various Master Plans (e.g. water utilities) there is no 5-year CIP program readily published in the annual budget or elsewhere. The overall City's CIP that is provided to policy makers for decision-making lacks in qualitative detail with respect to the scope, purpose, needs assessment information, etc. and should be expanded upon. |
| 4. The five-year capital improvement program for the Capital Projects Management Division clearly identifies the goals, priorities, and expected outcomes of the program. | Several details with respect to the capital program are discussed within the budget to include a target 2009-11 Work Plan Goal stipulating Develop a (5-year) Capital Improvement Program for our aging and sub-standard infrastructure. | The 5-year Capital Improvement Program is established by the Public Works Department. Future funding for CIP projects is only noted for two years in the City's Annual budget (through 2012). |
| 5. A formal written capital improvement program prioritization process has been developed for the five-year capital improvement program. | | There is no formal written program prioritization process established by the Public Works Department, Engineering Division, or elsewhere in the City. |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| 6. A list of deferred capital projects is presented within the five-year capital improvement program. | Deferred capital projects are generally recognized by the various work units and the Engineering Division. The impact of deferred maintenance is discussed in the City's financial policy (Appendix U of budget). Closed/cancelled projects are notated within department's capital program budget. | Deferred capital projects are implied based on list of cancelled projects. While the budget identifies generically the potential impacts of deferred projects, there are limited specific impacts noted in the document that are associated with deferrals (e.g. a serious decline in a Pavement Management Index). |
| 7. Capital project proposal packages are developed that present needed information in a consistent format and with adequate depth. | Proposal Packages are prepared by the Public Works Department with Engineering assisting and entitled in a fashion such as "Capital Improvements Wastewater Project." | These Proposal Packages are not included within the budget to inform policy makers. Proposal Package descriptions in "Project Description" and "Need for Project" can be periodically vague (one sentence each). There is no prioritization in these documents as noted above. |
| 8. When necessary, capital projects are proposed and budgeted by phase. This applies to large, multi-year projects that require significant community and stakeholder input or projects with limited funding or significant regulatory requirements. | Details are prepared by the Public Works Department with Engineering assisting and are related to various tasks and phases that are available in the Engineering Cost Estimate sheets related to each project. | |
| 9. Staffing requirements for all of the capital projects in the first year of the five-year capital improvement program have been identified. | Costs/hours are captured during project work by task. | Costs are provided with respect to tasks, but not projected/estimated internal staff hours to perform the project. |
| **Capital Projects Design** | | |
| 10. The Engineering Division has a systematic and formal process in place to determine whether an "alternative delivery" approach (e.g., Design-Build, Design-Build-Operate, Construction Management [CM] at Risk, self performed construction, and other strategies) or the traditional Design-Bid-Build model would be most appropriate for increased quality and / or reduced cost for each project | Only for projects under $25K. Various protocols are used under $5K, from $5K to $10K and from $10K to $25K. | Alternate delivery approaches are not considered for projects over $25K. |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| 11. The Staffing for design and inspection of capital projects is based upon the use of cost of construction guidelines. | | ASCE cost of construction guidelines are not used. |
| 12. The Staffing for the design and inspection of capital projects uses a resource loading approach (to avoid exceeding or underestimating staff capacity over a six to twelve month period) based on the use of cost of construction guidelines. | | ASCE cost of construction guidelines are not used. |
| 13. The Engineering Division has a clear design outsourcing strategy that focuses on core competencies and the continuity of the workload. | Outsourcing alternatives with respect to environmental, design, etc., are done on a project-by-project basis using professional expertise and judgment. | There are no written criteria employed to determine those projects that are designed by in-house staff versus those designed by contract engineers. |
| 14. The Engineering Division has developed a fully documented / written capital project delivery approach and structure. This approach and structure clearly establishes how projects should be executed, including the roles, responsibilities, and measures of performance for all parties involved. This process should include not only individuals in Engineering Division, but the ultimate "owner" of projects as well as any key support individuals or units. | There are updated documents with respect to street, water and sewer standards. | There are no documented policies and procedures with respect to overall project delivery. While various main steps have been outlined for the Project Team, this has not been formally memorialized. |
| 15. A different project control system is utilized for small capital projects than large i.e., use of standard designs, streamlined bidding process, site visits to equipment vendors, use of preferred construction vendors. | Project controls are typically delineated by three cost tiers: $5,000 or less, $10K or less or exceeding $25K. The third tier is fully formalized. | The first two tiers are not fully formalized with respect to project control approaches. |
| 16. Feasibility studies are completed prior to defining budget and scope for large capital projects. | City projects are generally not of this magnitude to warrant feasibility studies. | |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| 17. Capital projects are scoped and cost estimates developed before the commencement of design. | Projects are scoped and estimated before design. This is reflected in the Engineering Cost Estimate Sheets noted previously. Budget estimates contain cost estimates which would include construction and engineering estimates based on fairly open scopes. Construction cost estimates are completed prior to bidding based on the final design. | |
| 18. A project manager is assigned to the management of the design, construction inspection, and construction management of capital improvement projects. | Staffing in the City is small and project responsibilities are often shared. Ultimately supervision and management is responsible for delivery of projects. | A project manager is not formally assigned throughout the project engagement consistent with PMBOK standards. |
| 19. Project managers are responsible for capital improvement projects from "cradle to grave", with the authority, expertise, and responsibility to keep capital projects within budget and on schedule for project development, design, construction inspection, construction management, and closeout. | | A project manager is not formally assigned throughout the project engagement consistent with PMBOK standards. |
| 20. Standard design criteria (such as minimum grades for pipelines, maximum manhole spacing, etc.) have been established in writing. | Written standard are in place for water, sewer, streets, etc. In the absence of internal documents, ODOT, APWA and other criteria are followed. | |
| 21. An automated project management system has been acquired, and all of the engineering staff have been trained in and utilize the system. | Staff use the H.T.E. system to assist in project management of their particular engagements. | H.T.E is largely a fiscal tool; not a project management program. H.T.E. information is most often provided to other Division staff by the Support Technician. |
| 22. The design consultant selection is qualification based. | Selection is qualifications as opposed to "low bid" based. | |
| 23. An annual RFQ solicitation is used to develop an on-call list of pre-approved consultants. | | There apparently is no on-call list of pre-approved consultants. |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| 24. A pre-qualification process is utilized for selecting consultants and contractors for large and complex projects. | A pre-qualification process is utilized for contractors with forms available on the Engineering Division's webpage. There is a pre-qualified contractors list. Pre-qualification for consultants is done through an RFQ through the selection process. | |
| 25. Design of capital projects are accomplished on a 2D CAD system. | CAD systems are used. Dedicated personnel operated the City's CAD systems. | |
| 26. Authority has been delegated to the Community Development Director to approve low dollar consultant and construction contracts. | Some construction projects may be awarded by the Community Development Director, typically they are awarded by the Public Works Director. | Delegated dollar authority of $25,000 may be too low for certain positions (e.g. department executive) given best practice standards. This is a broader City-wide policy decision with respect to purchasing authority. |
| 27. A consultant rating system is utilized that identifies and evaluates the quality of consultant performance. | | A rating system is not formalized. Consultant ratings are not done formally (e.g. narrative write-up) in a post-project conference. |
| 28. The location of capital projects are portrayed in the City's GIS system and on the department's web site. | Various Engineering-related information is located at: http://www.grantspassoregon.gov/Index.aspx?page=455 CIP information is located at: http://www.grantspassoregon.gov/Index.aspx?page=494 this however, does not appear to be updated (e.g. given estimated completion dates on some projects). | |
| 29. Designers are required to develop a formal written project plan and schedule prior to the commencement of design. | There are detailed Engineering Cost Estimate Sheets. | While these sheets detail tasks and estimated costs, there is no linkage to a project timeline or schedule. Typically, if the design is to be completed by a consultant, they provide one with their proposal. If the design is to be completed in-house, a schedule is typically not provided. |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| 30. The capital project plan and a project schedule are reviewed with customers / stakeholders before the commencement of design. | | Developed schedules are not consistently reviewed with stakeholders although they are regularly contacted regarding "project priority" based upon workloads / conflicting project priorities, etc. |
| 31. When engineering design is provided for special revenue funds, internal service funds, or enterprise funds, the costs of design are charged to those funds. | Costs for all engineering services are "charged back." | Various issues have arisen with the current implementation of the "charge back" protocols to be further discussed in the Report. |
| 32. "Billability" targets have been set for the amount of hours that engineering staff charge to design and inspection of capital improvement projects and management monitors their success in meeting these guidelines. | Time is charged to projects through the project/cost accounting system. | Billability targets or performance standards for hours to be billed are informal only. Various issues have arisen with the current implementation of the "charge back" protocols to be further discussed in the Report. |
| 33. A Gantt chart schedule has been developed for capital improvement projects for a two to three year period that shows start and finish dates for projects. | | A Gantt chart or similar graphic has not been developed. |
| 34. There are clear, easily read capital improvement project status reports that match the level of detail needed by the expected audience. | | There are no formal project status reports developed for the project end-user. Status is communicated verbally and by other forms of communication such as email but rarely in "report" form. |
| 35. The customers receive quarterly project updates that contain status, schedule, task/time assessments, budget update, program update, potential problems, and critical issues. | | There are no formal update reports developed for the project end-user. |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| 36. The Engineering Division has clearly identified and defined its customers, established formal methods for communication with them, actively solicits feedback from them, and incorporates their feedback, as appropriate, into its activities to support project-specific goals and objectives. | These activities are performed mostly informally for internal and external customers for most project-related activities. | There is no formality with respect communicating with the customer (e.g. note formal progress reports). |
| 37. The Engineering Division has established formalized partnerships with the "owners and operators" of the facilities it delivers, i.e., Public Works Department. The Engineering Division has formalized the partner expectations by partner segment and tracks results relevant to the expectations to assure that Engineering Division is meeting and/or exceeding the requirements of its partners. | These activities are performed informally. | There is no formal process in place to track and ensure "high customer satisfaction." |
| 38. A project cost accounting system is utilized to enable comparisons of planned versus actual staff hours for the design and inspection of capital projects. | A detailed cost accounting system for Engineering Division operations is in place. | There is no data with respect to linking planned work hours with actual work hours. This function is practiced on a case-by-case basis but done so informally. |
| 39. Project managers have access to the automated financial management system to monitor the actual versus planned design, inspection, and construction costs for capital projects. | PM have access to necessary fiscal information. PMs have this ability to review but typically need/utilize the assistance of support staff. | Some areas are not monitored as they are not currently available, such as planned versus actual time on a project. |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| 40. The Engineering Division ensures that staff responsible for delivering capital projects are competent in performing their current and future project assignments. The Engineering Division has established competency criteria for all key project management functions and activities, e.g., years of experience, professional certifications, education, and demonstrable capabilities in performing technical, engineering, and project management work from entry to advanced level. The Engineering Division monitors training requirements for its staff, develops budgets and schedules to allow sufficient training, and maintains records of training and other professional development. These training activities are coordinated with Human Resources so that their training activities are complementary. | | Formal competencies have not been developed. While records indicate staff receive various training, no Engineering staff member has received a best management practice standard of a minimum of 40-hours annually (average) over the last 3 years. |
| **Capital Projects Quality Assurance / Quality Control** | | |
| 41. Quality control and evaluation mechanisms (e.g., final report) have been developed at the completion of capital improvement projects to enhance learning and correction of problems. | Engineering does discuss various elements of projects, including "lessons learned" during various stages of the projects during weekly staff meetings. | No formal lesson learned QA/QC is done at a post-project conference. No documentation is prepared with respect to outcomes. |
| 42. A formal value engineering study is completed for projects larger than $1,000,000. | | Formal value engineering studies are not performed. |
| 43. Engineering uses standard forms for RFI's, change orders, pay applications, field clarifications, minutes of meetings, etc. | Many standard forms are in place. Many are located on the Engineering Division's webpage. | |
| 44. Engineering completes formal written post-project reviews for lessons-learned. | Engineering does discuss various elements of projects, including "lessons learned" during various stages of the projects during weekly staff meetings. | No formal lesson learned QA/QC is done at a post-project conference. No documentation is prepared with respect to outcomes. |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| 45. For all major capital project management and inspection activities, the Engineering Division has developed measures or benchmarks to establish goals for project quality, time, costs, and customer satisfaction. Specific metrics have been developed to measure performance against project goals such as percent of projects on budget and schedule, size and number of change orders, and other key industry metrics. | Broader goals have been established. | Detailed and formal performance objectives or key performance indicators have not been developed. |
| 46. Up-to-date standard specifications are available that is easy for staff to interpret and understand, includes an index to make Engineering Divisions of the standard specifications easy to locate. | Significant documentation exists with respect to specifications used. Many have been updated as early as 2010. | |
| **Construction Management** | | |
| 47. 30% / 60% / 90% reviews of the design of capital improvement projects are conducted by Construction Management. | A 30%/60%/100% review is conducted generally within the "completion ratios." | |
| 48. A formal written change order process is in place that defines all forms and methods necessary to finalize change orders. | This process is underway. | A formalized change order process is not in place to ensure consistency across all staff. |
| 49. Change order authority has been appropriately delegated to the City Engineer and the Community Development Director for change orders up to the change order contingency. | Change order authority has been delegated to the City Engineer and Public Works Director. | |
| 50. A change order contingency of 15% is set-aside at the start of a project. | | A change order contingency of 20% is typically set-aside based on Engineer Division Cost Estimate sheets provided. |
| 51. A formal dispute resolution process is included in all contract agreements. | A formal dispute resolution is in place for all formally bid projects and is included within the standard specifications. This applies to contractors only. | There is no written dispute resolution process in place for professional services or smaller projects done under short form contract. |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| 52. Inspectors utilize automated input devices to record inspection results or display inspection history while in the field. | | PDAs, laptops and in-field software is not used to facilitate and record inspections. |
| 53. Inspectors assure off-site compliance with NPDES requirements and City-Adopted best management practices to mitigate the impacts of construction on stormwater quality. | A standard checklist is in place to ensure compliance. | |
| 54. The inspectors and project manager make the final walk through of the project to develop a punch list of clean up items for the construction contractor. | A punch list is developed. The inspectors also request that the various divisions of the Public Works Department to walk through the project and develop their punch lists. These divisional punch lists are provided by the various divisions and are provided to the Engineering inspectors in writing. | There may be opportunities to improve the method in which punch list development and resolution is performed to be discussed in the Report. |
| 55. After completion of the project, the construction contractor is required to complete as-built drawings. | As-builts are required of the contractor. These are ultimately finalized and stored in Mylar and CAD format. | |
| 56. Nine months after substantial completion, the inspectors contact all applicable City Departments notifying them that the warranty period is expiring and any outstanding deficiencies should be reported. | Engineering performs a warranty period inspection for all projects, public and private. Engineering coordinates the inspection with various divisions of Public Works. Public Works provides written documentation. | Warranty period notification is not formalized as such in an "operations manual". . |
| 57. The Engineering Division has developed a systematic and formal method for incorporating constructability reviews from both internal and external industry experts, and operability reviews involving the future project "owners" i.e., the Public Works Department. There is a systematic and formal method to incorporate lessons learned and feedback on completed projects into future projects. | | External industry experts and formal constructability reviews are not used. |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| 58. Staffing for inspection of capital projects and private development projects are based upon cost of construction guidelines. | | Inspection staffing is not based on ASCE cost of construction guidelines. |
| 59. A pre-construction conference is conducted at the beginning of each capital project construction contract. The prime contractor, pertinent subcontractors, the project manager, and inspector attend this conference. | Pre-construction conferences are always held. | |
| 60. The inspectors are responsible for checking and verifying the contractor's application for progress payment, and forwarding a recommendation of approved pay request to the project manager for payment. | Inspectors are responsible for routing such information. Additionally the inspectors are responsible for checking the work performed on the progress payment as well making recommendations, not just routing. | |
| 61. Inspectors make the initial analysis of change order requests for capital projects. | Inspectors make the initial analysis and are also responsible for the initial negotiations. | |
| 62. The inspectors maintain a personal project diary, prepare daily reports, and keep accurate records of change orders, correspondence, progress payments, shop drawings, project mix designs, material tests, samples and approved traffic control plans. | Personal diaries are maintained and later included in the Project Folder for each project. | |
| 63. The inspectors verify the adequacy of construction survey and staking to ensure the work is correct including reviewing a sample of survey notes for grading, measurement of pay quantities, etc. | | The inspectors do not verify the adequacy of construction surveying and staking, etc. as an on-going practice. They will question surveying on both private as well as capital projects if they believe they note something that is amiss. |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| 64. The inspectors schedule all testing with the contracted materials testing firm under current contract with the City and review the results of these tests. | The General Specifications dictate that the Contractor shall furnish the testing utilizing certified testers. Inspectors determine which tests will be performed, their location and frequency. Inspectors check the test results for conformance. | There is no standardization with respect to frequency and type of tests to be performed. The City does not have a contracted testing materials firm. |
| 65. Newly constructed storm water mains are required to be videotaped before acceptance. | | Storm water mains are currently not required to be video inspected. |
| 66. Newly constructed sanitary sewer mains are required to be air tested, flushed and cleaned, and videotaped. | All new sanitary mains get air tested, checked for roundness, flushed, cleaned, and videotaped. | |
| 67. The contractors furnish product data, mix designs, shop drawings, material certificates and samples in sufficient detail to show complete compliance with all specified requirements. | The contractor furnishes data to show contract / specification compliance. | |
| 68. The inspectors are given a copy of all approved submittals and shop drawings. During the construction phase, the Inspector verifies the products delivered to the project match the approved submittals. | Inspectors reconcile paperwork with field observations. | |
| 69. The inspectors are required to develop communication plans for the public for capital projects including the provision of notices to the public living in the project area regarding the project. | Communication plans are facilitated by various Engineering Division staff including Business Operations Support personnel in the Department. | |
| 70. Inspectors track warranty requirements and start and completion dates. | Inspectors track appropriate warranty information. | |
| **Pavement Management System** | | |
| *71. A formal pavement management system has been developed and includes:* | [redacted] | |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| • A system to regularly collect pavement condition data based upon a systematic evaluation of the pavement every two to four years; | Public Works has started and is responsible for the program. Engineering is providing support for the program. | The department is currently implementing Micropaver 6.1.4 for their pavement management system. Road sections are currently being inspected. No Pavement Management Index has yet been developed. |
| • A computer database – APWA MicroPAVER - to sort and store the collected data; | The MicroPaver database is used. | See above. |
| • An analysis that assigns a PCI score to the pavement (0 to 100) based upon the pavement condition; and | Analysis is conducted; the most recent PCI score is 74. | See above. |
| • A program that evaluates repair or preservation strategies and suggests cost-effective projects to maintain pavement | A three-year strategy is developed and placed in context of annual downtown maintenance, potentially annual arterial maintenance, and 8-year zone cycle street maintenance program. | See above. |
| **Development Review** | | |
| 72. An automated permit information system is utilized to (1) accept and issue engineering permits and plan review comments; (2) assure the status of each submittal is visible during the plan check process; (3) manage the processing time for engineering permits; (4) provide a database of engineering permits; (5) enable all of the departments/divisions involved in the engineering development review process to enter and retrieve data; and (6) facilitate customer service through access to the internet to enable customers to submit routine engineering permit requests. | H.T.E. is utilized with respect to the permit information system and is capable of generating data with respect to items #1-#5 listed. The City is looking into a better permit system with SunGuard. | |
| 73. A one-stop shop exists for submittal of all of the City's development review plan applications; engineering applications are submitted at the City's "permit counter." Engineering staff are available at the City's permit center. | A one-stop philosophy exists. Staff have recently been relocated to facilitate communications and customer service. | |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| 74. The extent of development review applications deemed incomplete by the Engineering Division after the initial application review is no more than 25% to 33% of initial submittal. | | Incomplete applications are not tracked. Multiple applications take additional internal staff time. |
| 75. Engineering development review applications are checked at the counter upon submittal for initial completeness and rejected if missing basic items. | The counter checks for completeness and rejects if incomplete. | |
| 76. Cycle time objectives for the processing of the development review applications by the Engineering Division have been established for the various types of permits processed by the Engineering Division. | Cycle time objectives have been developed. | |
| 77. A monthly report is generated reporting actual vs. planned performance against these cycle time objectives | | Data is available but monthly reports are not generated unless data is requested. |
| 78. Decision-making authority has been appropriately delegated to the staff of the Engineering Division for the approval of low exposure/low impact engineering applications and permits. | Staff have been delegated appropriate decision-making authority. | |
| 79. Engineering permits are processed using a concurrent process. Engineering permit applications are distributed simultaneously to all of the departments/divisions for engineering permit plan review. | A concurrent as opposed to consecutive process is utilized. | |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| 80. Engineering utilizes a case management system to manage the length of calendar time required for processing of engineering permits. The system includes the exercise of authority by the Engineering Division's case manager with the other departments/divisions to resolve delays in completion of plan checks. | | A case management process is not formally utilized. Notifications are done informally, mostly facilitated by the Engineering Division's support technician. |
| 81. The Engineering Division fully recovers the costs of its development review including direct and indirect costs. | Development review is a fixed price fee. Subsequent work is billed on "time and materials" basis thereby ultimately covering costs. | Intent may not translate into actual full cost recovery as model is based on fees that have been periodically "frozen." The Engineering fees did get a CPI-U index increase. However, they were frozen for a period. Various issues have arisen with the current implementation of the "charge back" protocols to be further discussed in the Report. |
| 82. The Engineering Division projects future workload and staffing needs based upon "in-progress" projects recognizing that large projects may span several years and revenues received upon application are designed to cover future work also. | Staffing is determined by in-progress work as well as taking into account future projects. Engineering generates revenues on "billing hours". The more projects, the more revenue is available. | Internal staffing needs do not flex based on projected workload; budget availability thus has more impact on internal staffing decisions than long-term workload projections which "fit staff" rather than "fit rehabilitation/replacement requirements." This, however, is not atypical in the economically stressed public sector. |
| 83. The City annually conducts a cost of service analysis to update the costs of providing development review services and update the fees. | | Fee modifications are not done annually. Engineering is supposed to, by ordinance, get a CPI index. However, those were frozen a few years back. There was a CPI index applied recently. |

| Best Management Practice | Strengths | Opportunities for Improvement |
|---|---|---|
| 84. Engineering permit processing checklists have been developed for the various types of submittals to enable the staff to focus their attention on the relevant aspects of permit application and assure uniformity among staff. These checklists are available on the Engineering Division's web site. | Checklists conform to these standards. This is also being looked at for enhancement. | |
| 85. An inter-departmental development review committee is utilized to coordinate the review and consideration by staff of the development review permits applications. | Many of these activities are performed regularly within the weekly Site Plan Review Committee. | |
| **MISCELLANEOUS** | | |
| 87. A positive approach to customer service is utilized through such approaches as: | | |
| • Desk-level counters with chairs for both staff and the customer; | The City Hall building facilitates customer service, particularly given recent staff re-locations. | |
| • The provision of easy-to-understand and attractive application guides to the engineering development review process | | Article 17-19 regarding the development review process is available on the City's website but is difficult to navigate to. |
| • The use of a periodic newsletter to keep developers appraised of changes to the standard specifications, staff, etc; and | | There is no periodic newsletter in use. |
| • The use of customer surveys to assess the satisfaction of customers. | | There are no formal customer satisfaction surveys conducted. |
| The City's survey records are available to the public on the internet. | Various GIS, survey and other related mapping records are located at: https://www.grantspassoregon.gov/Index.aspx?page=406 | |

# 4. SERVICE LEVEL SURVEY OF EXTERNAL CUSTOMERS

As part of the Performance Audit of the Engineering Division, the Matrix Consulting Group (MCG) was provided by the Community Development Department a compiled listing of contractors who have done various public works projects and developers performing private projects. The purpose of this list was to facilitate interviews in order to gain perceptions from external customers as to the quality and quantity of services provided by City Engineering. Whereas the prior best management practices chapter provides the Matrix Consulting Group's broader assessment of organizational strengths and potential opportunities for improvement, this chapter provides a broad perspective of Engineering operations from the external customers' viewpoint. The following section contains summarized responses to telephone interviews conducted based upon our random sampling[2] of these external customers. The telephone survey consisted of four primary questions where the respondent was asked to give their overall opinion, as well as perceived strengths and weaknesses. The four questions were:

- What types of projects are you involved with in the City?
- What are your perceptions of overall City services provided to you, including Engineering and how those services are impacted by Planning, Administration, Council, etc?

[2] Our methodological approach for picking firms was to first look at the number of projects firms had worked with the City. We contacted those who had done multiple projects, as well as those who had only worked with the City on one or two projects. In choosing interviewees who had only worked with the City once, we selected firms who had paid the highest fees. When discussing project outcomes with the interviewees who had done multiple projects, we used the project with the highest fees as our baseline example.

- What are your perceptions of the direct services provided by the Engineering Division?
- Describe the process for determining total fee costs? How easy is the overall fee process to understand?

The telephone survey was conducted during the weeks of February 14th & 21st and included a random sampling of developers and contractors who have worked with the City. Those included in the survey ranged from customers who have limited experience in working with the Engineering Division, as well as those who have had multiple projects with the City. The survey was conducted confidentially, so the respondent responses have been summarized by question.

The sections below summarize the responses of the telephone survey.

**1. WHAT TYPES OF PROJECTS ARE YOU INVOLVED WITH IN THE CITY?**

The range of project types that respondents were involved with included: public and private works, excavation & paving, sewer and water line repairs, city street overlays, and various commercial projects.

**2. WHAT ARE YOUR PERCEPTIONS OF OVERALL CITY SERVICES, INCLUDING ENGINEERING AND HOW THOSE SERVICES ARE IMPACTED BY PLANNING, ADMINISTRATION AND COUNCIL?**

Respondents were not very vocal about perceived strengths of overall City services. For those that offered feedback, City staff were viewed highly, and building and inspection services were seen as being prompt. Respondents as a whole feel that they have good relationships with City staff.

In looking at opportunities for improvement, interestingly respondents voiced concerns about the Planning Division[3] and Council responsiveness with respect to what is perceived as planning and engineering-related issues. It is believed that the planning process is drawn out, and that the Planning Division as a whole seems understaffed. This led to a perception of some inconsistency in applied standards. While respondents feel that the Council is receptive to issues brought before them, they feel that their follow-through with communication and overall responsiveness could be improved.

Overall, the perceptions of City services surrounding engineering-related efforts were somewhat positive as opposed to negative. Respondents noted that while there were issues that come up from time to time, generally everyone (to include city staff and developers/contractors) is ultimately able to work together and complete projects in a reasonable manner.

### 3. WHAT ARE YOUR PERCEPTIONS OF THE DIRECT SERVICES PROVIDED BY THE ENGINEERING DIVISION?

Respondents listed several strengths of the Engineering Division to include knowledgeable staff, good response times, and accessibility. Many respondents felt that the process was user friendly, and that they had good working relationships with the staff. Also highlighted were the strengths of the administrative/technical staff in charge of fielding calls, putting together proposals, and defining project scopes.

When asked to provide examples of improvement opportunities, respondents spoke of staffing, process transparency, and the inconsistency of the application of standards. Many respondents noted that there is a lack of communication between staff,

[3] There was some perception that planning and engineering were indistinguishable. This may be due to perception as a result of both divisions being part of the Community Development Department and staff multi-tasking to support their inter-division colleagues.

especially the management/supervision of Public Works and the Engineering Division. There is a perceived knowledge gap, whereby more junior employees seem to have a better understanding of standards and requirements than more senior employees. As a result of this alleged disparity, respondents feel that standards are not applied to all projects fairly or consistently. A few respondents mentioned the need for the City to be more open-minded when it comes to working within accepted project standards, with the possible benefit of cost savings to not only the client, but also to the City. Transparency of this process was also raised as an issue.

Overall, the positive perceptions of Engineering Division services pertain to the friendly and accessible staff while opportunities for improvement largely surrounded the need for enhanced communication, clarity, and a better transfer of knowledge between staff.

## 4. DESCRIBE THE PROCESS FOR DETERMINING TOTAL FEE COSTS? HOW EASY IS THE OVERALL FEE PROCESS TO UNDERSTAND?

Respondents had mixed opinions about the process for determining fee costs with some interviewees seeing the approach as convoluted, while others felt the process was generally clear cut. While some people feel the formulas for calculating various fees are clear (e.g. Development Review), most feel that the structure could be simplified. Respondents voiced concerns that fees can vary depending on how knowledgeable the individual staff person you are interacting with is with respect to the project and scope being worked. As fees are based on time and materials, the “quality” of the staff person you are working with can directly affect the cost paid to the City. Another issue brought up by respondents was that the steps for obtaining or needing a

permit weren't always clear, which at times led to not fully understanding what fees were actually needed to be paid.

In general, respondents feel that some fees appear to be in line with those being charged in surrounding jurisdictions, while some fees seem to be disproportionately higher. In effect, there was no clear consensus on fees for service.

## 5. CONCLUDING OBSERVATIONS.

As in any interview process, observations are subjective and not objective data. They represent essentially "snapshots in time" whereby interviewees have a tendency to recall highlights of their experiences as opposed to comprehensive details. Oftentimes, respondents are concerned about confidentiality despite assurances of anonymity. Consistent with our philosophical approach to these kinds of inquires we will not share who was contacted during this process (although we maintain it as part of our audit records). Despite these various caveats, given the community-service nature of the Community Development Department and its Engineering Division, it is important to solicit the opinions of customers and juxtapose these perceptions against independent data collection efforts. In sum, the perceptions noted herein should provide some fundamental guidance with respect to how various engineering-related operations are perceived by end users.

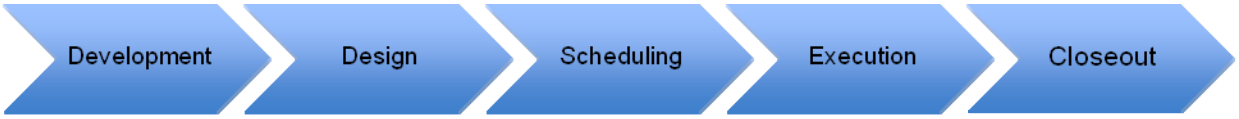
# 5. ENGINEERING WORK PROCESSES AND SERVICE LEVEL REVIEW

This chapter presents an analysis of the Engineering Division's work processes and service levels, emphasizing those areas where opportunities for improvement are noted. The following analysis is based upon both previous efforts discussed in prior chapters as well as further analyses based upon data collected from the Division. As noted in the Profile Chapter, the Engineering Division's staff performs a variety of duties and responsibilities. Major work processes performed by the division are discussed in the following sections.

## 1. MANAGEMENT OF CAPITAL PROJECTS AND DEVELOPMENT SERVICES.

Project management is defined by the *Project Management Institute* as, "the application of knowledge, skills, tools, and techniques to a broad range of activities in order to meet the requirements of a particular project. Project management is comprised of five processes – Initiating, Planning, Executing, Controlling, and Closing – as well as nine knowledge areas. These nine areas center on management expertise in Project Integration, Project Scope, Project Time, Project Cost, Project Quality, Project Human Resources, Project Communications, Project Risk Management and Project Procurement." These project management elements are abstracted from the Project Management Body of Knowledge (PMBOK) standards sponsored by the *Project Management Institute (PMI)*—the preeminent organization for project management best practices.

Based upon the principles of effective project management, various professional organizations have attempted to graphically depict key project management concepts related to engineering-based design/construction services. One such graphic, with the associated "project success elements" in table format, is shown below.

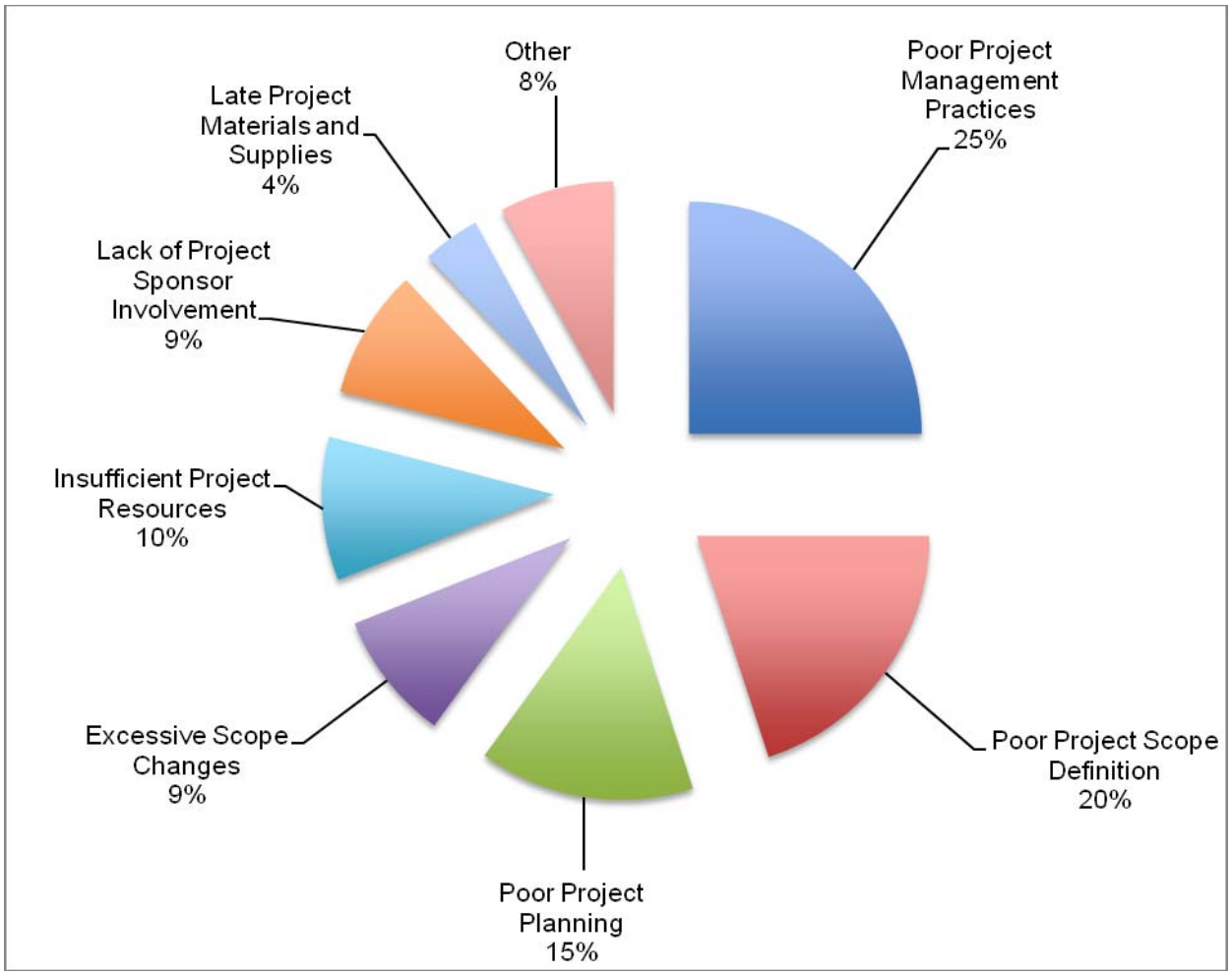



| Development | Design | Scheduling | Execution | Closeout |
|---|---|---|---|---|
| Development of the initial project scope | Complete detailed project designs | Build resource loaded project schedule | Monitor project mobilization activities | Monitor project demobilization activities |
| Management of scope additions | Long lead-time materials ordering | Integrate project schedule with other concurrent activities | Monitor work performance | Monitor punch-list items close-out progress |
| Development of the project execution plan | Track project plan implementation activities | Develop earned value or other cost and schedule metrics | Monitor actual schedule and cost versus plan | Documentation closed out |
| Development a project work breakdown structure | Develop project risk points and mitigation plans | Complete development of work packages | Conduct progress status meetings and develop progress status reports | Monitor progress in design drawings updates with as-built field changes |
| Development and monitoring of a project readiness measurement process or tool | Develop project QA / QC program | Integrate schedule activities into work management process | Monitor project scope changes | Documentation closed-out |
| | | | Monitor project risk mitigation triggers | |

The importance of effective project management cannot be underplayed. Typical project management shortcomings and critiques by engineering services recipients were captured by *the Construction Industry Institute* of project delivery for a wide variety of project types. The results of their study indicate the following sources for project failures as noted in the chart below.[4]

[4] Data from Construction Industry Institute.

**Summary of Perceived Project-related Failures**




In summary, based upon the previous data, the process for managing projects is the cause of 69% of project failures to such processes as poor project management practices, poor project scope definition, poor project planning and excessive scope changes. All these problems could be mitigated by effective project management.

Based upon the overarching philosophy of PMBOK project management techniques, and driven by the noted primary project-related failures reflected in the pie chart above, the project team has identified several *project management principles* that should be applied to engineering-related capital, development, or other managed

projects. These principles reflect the following eight areas that the Matrix Consulting Group (MCG) believes comprise the core project management process:

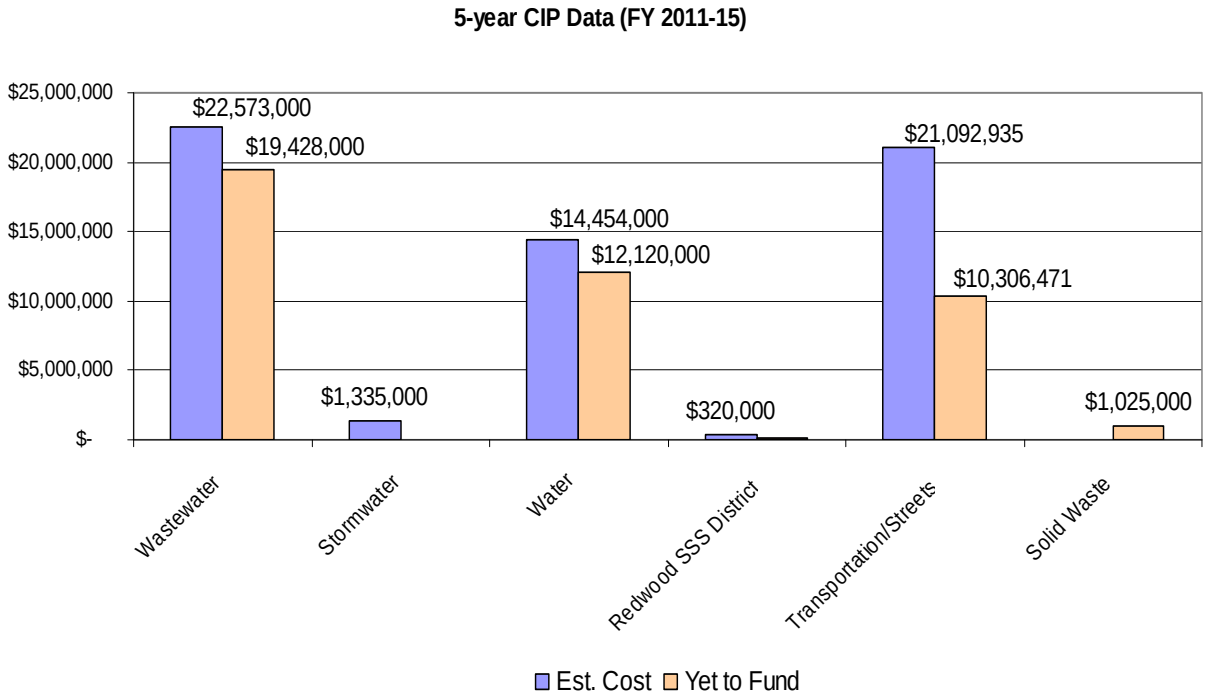
- Preparation of a project budget;
- Definition of the project, including its scope, staff resources required, project costs, and project priority;
- Establishment of plans and schedules for each capital improvement project to determine what tasks are to be performed internally and by private contractors, as well as the start, end and milestone dates;
- Monitoring and regularly reporting the progress against each element of the schedule for each project;
- Maintenance of the financial control systems necessary to ensure timely reports on current expenditures of funds for each line item of the project;
- Development of a system to alert top management to cost, schedule, legal and other difficulties, and unusual circumstances encountered during the course of the project;
- Management of the staff and consulting resources involved in the project in order to adjust to changes in priorities and project mixes as well as to enable completion of the project on schedule and within budget; and
- Management and coordination of the various parties needed to complete the project.

These eight areas will frame the discussions throughout the remainder of this chapter.

## 2. PROJECT BUDGETING: FIVE-YEAR CAPITAL IMPROVEMENT PROGRAM (CIP) PLAN AND INDIVIDUAL PROJECTS.

With respect to project planning, development, and budgeting the City of Grants Pass has prepared a 5-year CIP Plan spreadsheet that was made available to MCG.

Highlights of the data are summarized graphically in the chart below:




As illustrated by the graphic which only incorporates Public Works (not all) projects[5], with the moderate exception of Transportation and Streets projects, there is an apparent significant need for various capital projects yet most are not yet funded. By example, Wastewater projects have been identified that total $22.57M in costs yet $19.43M has yet to be funded for such projects. In total, CIP projects for the next five years total nearly $61 million dollars, yet 69% of this budget (approximately $42 million) does not yet have identified or projected funding sources linked to the projects; this is particularly the case for water and wastewater initiatives. According to staff conversation, "Several projects have no funding allocated as unless revenues increase significantly there are far more projects which need to be built than revenues allow."

This graphic specifically demonstrates the large difference between funds

[5] Stormwater had an actual net deficit in the 'Yet to be Funded' category of -$44,451; Solid Waste had a 'Yet to be Funded' category but no 'Estimated Cost' category. In effect the graphic is a summary of a CIP spreadsheet and "work in progress." According to City staff, there are several variations, including a spreadsheet for FY 2012-16 that was provided near the end of the project engagement.

apparently needed and funds required over an important planning horizon. This critical planning information, however, is not duplicated in any fashion in the *City's Adopted Operating & Capital Budget: FY 2010-11*documentation. Indeed, none of the numbers noted above are found within the budget document. Of further import, there are only two references within the entire budget book with respect to a "five-year capital improvement plan:"

- On page 37 of the budget book as a component of the 2009-11 Work Plan an element was to, "Prepare a proposed five-year capital improvement program for our Utility infrastructure. Staff and Council will work to fund the prioritized improvements through available resources."
- On page 360 (Appendix U) of the budget book as a component of the City's Financial Policies it was indicated, "The City will prepare a five-year Capital Improvements Plan and a one-year Capital Improvements Budget."

Particularly in light of the above, there is presently very little detail regarding a five year CIP, with a six-page spreadsheet the entirety of a longer-range CIP plan. There is a far more detailed document supplementing the budget entitled, *Adopted Capital Budget Fiscal Year 2010-11,* yet this document (to be discussed in further detail subsequently) only provides projections for the current and next fiscal year. According to other data provided by the City, The CIP projects for water, wastewater, transportation, parks and other areas of capital responsibilities are established from long term planning documents such as the Water Distribution System Master Plan and the Wastewater Collection System Master Plan. These documents typically are created for a planning period that range from 10 to 20 years but can potentially be updated on a more frequent basis. The responsibility for updating these plans and developing the attendant mid-term (e.g. five years) capital implementation strategies resides within each department responsible for capital improvements. Typically the Engineering

Division is consulted on an as-needed basis for input as they have data such as GIS and as-built information to help make CIP decisions. Staff within these respective departments are responsible for creation of the CIPs. Capital needs are based on the various system operators' knowledge and those are weighted against the available funding typically by Department-head positions that help prioritize work. Knowledge of these systems comes from a combination of computer modeling, institutional knowledge and professional judgment.

While the City does take various steps as noted previously with respect to longer range capital planning, there is opportunity for improvement. The purpose of a Capital Improvement Program (CIP) is to serve as a planning tool which coordinates the financing, scheduling and staffing level of major capital projects undertaken by the organization typically during the next five year planning horizon. The CIP document is a statement of the organization's goals, objectives and priorities for a five-year CIP and the financial commitments required to accomplish those objectives. The purpose of the CIP is to provide an organization with a long-range program for major capital construction projects based upon the systematic development of an accompanying financial plan. The CIP is to identify capital improvement needs and to coordinate financing and timing of those needs in a manner that maximizes benefit to the public. As each annual budget is prepared, additional projects and priority needs are identified and added to the CIP to maintain a "rolling" five-year plan. Often, capital projects presented in a five-year Capital Improvement Program are the organization's major projects which exceed $50,000-$100,000 in cost, have long-term life spans, and are generally non-recurring. They usually fall within one of the following six categories:

- Acquisition of land for public purpose;
- Construction of a significant facility (i.e. a flood protection facility, a new road, or a building);
- Addition to or extension of an existing facility;
- Nonrecurring rehabilitation or major repair to all or part of a facility, provided the total cost is more than $50,000;
- Any specific planning, engineering study, or design work related to an individual project falling within the above categories
- Significant one-time investment in tangible goods of any nature, the benefit of which will accrue over a multi-year period. Examples include items such as large initial investments in technology improvements or the purchase of a new telephone system.

In the annual development of a five-year CIP, a variety of steps generally occur; however, these can be generally summarized in the following key process steps.

- Draft development of a CIP document by technically proficient and interested parties (e.g. Public Works and Community Development divisions);
- Management and Executive Management review and approval of the draft to ensure staff proposed projects are aligned with City Council directives;
- Prioritization of all projects including continuing and newly proposed projects, to ensure consistency with Council priorities;
- Financial analyses to determine capacity of City resources to fund the planned projects;
- Outreach to public agencies within the City to coordinate capital improvements work, as necessary (e.g. not re-paving a road when a new cable/fiber optic line is to be installed in the foreseeable future);
- City Council or special committee review and direction at appropriate interim steps to ensure the CIP reflects the Council's policies and priorities;
- City Council public hearing and adoption of the Five-Year CIP.

In summary, the five-year Capital Improvement Program process should be second only to the annual budget preparation process as it relates to an organization's

planning priorities, particularly given in many agencies such programs run into the millions on an annual basis.

In the absence of a truly formal five-year Capital Improvement Program process and resulting document, it is extremely difficult for the Engineering Division, the Public Works Department, etc. to undertake longer range work without an approved long range plan. And whereas the project team recognizes that there are budget constraints which impact the ability to effectuate a longer term vision, the purpose of a long term plan based on agreed upon needs is to help align required projects with fiscal realities.

Developing an appropriately informative five-year CIP template is beyond the scope of this report. According to conversation with the City Engineer, the previously noted 5-year capital project spreadsheet is a new process created by Public Works that has not been adopted during the budget process in the past. Apparently (and progressively) Public Works is trying to adopt a 5-year capital plan for the upcoming FY 2012 budget. There are a variety of different formats under which a CIP can be developed. The aforementioned *Adopted Capital Budget Fiscal Year 2010-11* provides a framework that could be expanded upon. Further examples are located in a variety of other municipal, county, or special district organizations' websites, two examples of which are provided in the following footnote.[6] Although these documents serve as relevant and informative examples, they do lack to some degree some of the best management practices elements that are entailed in the highest quality CIP planning documents. These elements include:

[6] http://www.cityofrockford.net/government/works/index.cfm?section=reports&id=674#CIP_5Year_Plan or http://www.ocsd.com/documents/contents.asp

- Staffing requirements for all of the capital projects in the first year of the five-year capital improvement program have been identified.
- The five-year capital improvement program for the Capital Projects clearly identifies the goals, priorities, and expected outcomes of the program.

In conclusion, creation of a comprehensive five-year CIP should be led by Public Works and the Engineering Division in partnership with the City's Finance Department.

***Recommendation: Implement a comprehensive five-year Capital Improvement Program consistent with the City's Financial Policies and framed by key process steps noted in this chapters. This should be led by Public Works and the Engineering Division in partnership with the City's Finance Department.***

**(1) Individual Project's Budgeting.**

An important component in effective project management is the appropriate budgeting of individual projects and the fiscal management of these projects. The following table portrays what has been defined by the Engineering Division as Capital Projects currently under design and construction. These projects, presently being managed to one degree or another, provide a sample of projects where budgetary issues can be identified.

**Capital Projects Currently Under Design/Construction (Engineering Division)**

| Project | Project No. | Total Budget | % Project Budget Completed |
|---|---|---|---|
| Tussing Park Improvements | LB4261 | $ 495,000 | 102% |
| River Overlook 2 (8th Street SW Quality Feature) | LB4718 | $ 55,000 | 1% |
| L Street Sewer & Water Mains Replacement | SE6050 | $ 260,000 | 4% |
| Fruitdale Trail | TR4719 | $ 335,000 | 49% |
| Hubbard Lane Widening | TR4924 | $ 2,450,000 | 23% |
| Sidewalks in Parks | TR4932 | $ 192,000 | 74% |
| Redwood Avenue LID (Dowell to Hubbard) | TR4934 | $ 4,600,000 | 0% |
| Bike Lane Striping | TR6028 | $ 75,000 | 54% |
| Overlays/Maintenance FY 11/12 | TR6031 | $ 1,200,000 | 36% |
| Midland Avenue Sidewalk | TR6074 | $ 110,000 | 2% |
| Savage Street Sidewalk | TR6077 | $ 200,000 | 0% |
| Water Main in Private Property | WA5028 | $ 50,000 | 6% |

The following observations are noted with respect to various selected projects.

Note that such findings are illustrative as a comprehensive review of each individual project in the above list was not conducted.

- **Tussing Park Improvements (LB4261)**. *This project improved Tussing Park, installing the first phase on the current Tussing property. Designs have been completed for the second phase. This phase will construct parking and restrooms on the adjacent property and remove a structure.*[7] The project is currently over budget by approximately $10K (as of 2/10) with 90% of construction complete. Given this, further cost overruns will be incurred prior to project completion. While project overruns are not entirely avoidable, fully effective project management allows for effective contingency funding that should address potential cost overrun opportunities. The noted expenditures include for 2009-2010 (calendar) 585 hours of Engineering Division internal charges for Administration, Inspections, Contract Development, etc. This represents approximately 8.5% of the project budget expended.[8]

- **River Overlook 2 (LB4718)**. *This project had been planned to do a combination river overlook at the end of 8th Street. While there does not appear to be interest to move that project forward, there is a need to address the quality of the storm water that is dumped into the river. In addition, this project would rebuild the outflow device to eliminate the unsightly trash buildup.* Only 1% of the project budget has been expended, the large majority of which is linked to 7.5 hours of internal Engineering Division charges. Budgetary issues are linked to the fact the project remains "on the books." Indications that there is a "lack of interest" in the *Adopted Capital Budget Fiscal Year 2010-11* text demonstrates that there are opportunities to better prioritize CIP projects. If this project is on long-term hiatus as the text suggests, it should be removed from both long term plans and short term budget documentation. Interestingly, this project does not appear on the 5-year CIP Plan spreadsheet indicating a lack of nexus between these worksheets and formal project documentation.

- **L Street Sewer and Water Main Replacement (SE6050)**. *This project will replace approximately 800 linear feet of sewer main and 380 linear feet of water main. The existing sewer main is severely deteriorated and failure has begun to occur. Concurrent with the sewer main replacement, the existing 2" water main will be replaced with a new 8" line.* Interestingly, despite the noted description this project has apparently been placed on hold until at least FY 2012. It was indicated that 90% of the design was accomplished internally within the Engineering Division, and while the majority of the expended budget would reflect such internal charges, the 69 hours charged through 2010 are allocated to

[7] Introductory text to projects is taken directly from the *Adopted Capital Budget Fiscal Year 2010-11* and such text will be *italicized.*

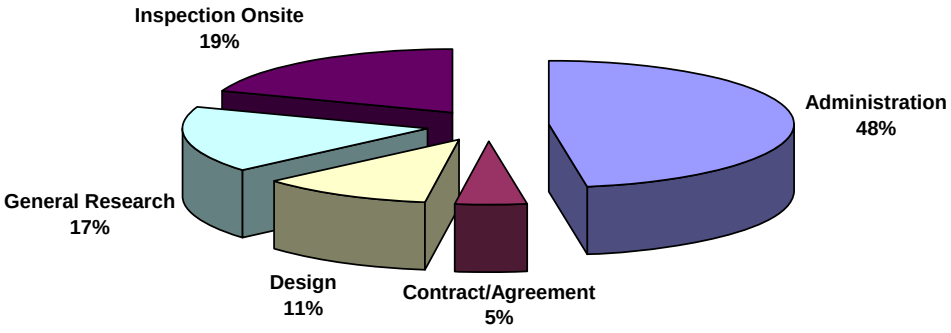
[8] Engineering staff costs will be discussed further in later sections. The estimated cost is based on an average hourly rate of $73/hour based upon weighted averaging of Engineering staff hourly rates. This $73 will be used consistently although actual costs would vary dependent upon who was assigned to each project.

Administration, Contract/Agreement, and Miscellaneous charge categories, not design.

- **Hubbard Lane Widening (TR4924)**. *This project would widen Hubbard Lane from Redwood Avenue to Highway 199. . Over the next two years, the design will be completed and the right of way purchased. Based on this work, an accurate cost estimate can be prepared. The State is preparing a project that will install a signal at the intersection of Highway 199 and Hubbard. In anticipation of this signal, the road should be widened to allow for vehicles as well as pedestrians and bicyclists. There is no possibility of a Local Improvement District covering the entire length as there are few Deferred Development Agreements within the boundary. The City will continue to search for grants to reduce costs to Transportation SDC and for other future resource needs. The widening of Hubbard Lane is ranked #14 on the priority list. Original estimate: $4,220,000. Estimated Total Project Cost: $ 2,450,000.* Based on data provided, 23% of the $2.45M budget has been expended, the large majority related to constructing a precursor water line. Internal project management documents indicated that 30% of Design was completed yet 0% constructed (an error). Internal Engineering Division charges include 528 hours of waterline work (TR4924W) that incorporated nearly 330 hours of inspection and 190 hours of AFD Preparation and Administration Workload. Charges to the widening project included 628 hours in 2009-10 of which 95% were administrative-related functions including Administration, General Research, Meetings, and Miscellaneous categories. Two budget-related issues are evident in this project: 1) The original estimate was over 70% of the revised budget indicating potential opportunities to improve cost estimating (barring extenuating project circumstances) and, 2) significant internal Engineering Division charges surrounding administrative-related efforts, such as Advance Financing District set-up, have been charged to the lane widening project.

- **Sidewalks in Parks (TR4932)**. *This project will install sidewalks in parks throughout the City. The City has a number of parks developed before the requirement to install sidewalks along the frontage of developing property. Using funding through ODOT, sidewalks will be installed in all City parks, including Stansfield Park, Westholm Park and Kesterson Park.* In 2009-10 (calendar) 649 Engineering Division internal hours were charged to this project in the following task types:

**Sidewalks in the Park - Engineering Division Internal Charges by Task Type**




These hours represent an estimated one-third of the total project budget expenditures. Of particular interest, administrative-related charges, as shown in the pie chart above, reflect 70% of total charges incurred. These internal billing/budgetary issues demonstrate important issues, to be discussed subsequently, deserving resolution.

In summary, a review of projects currently under design and construction indicate various project budget-related and other opportunities for improvement. These include the following project management areas.

**(2) Individual Project Cost Overruns.**

Project cost overruns should be avoided (e.g. LB4261). While project overruns are not entirely avoidable, fully effective project management allows for proper cost contingency funding that should address potential cost overrun potentialities. While

information indicates that Grants Pass plans for a 20% contingency[9] on their Engineering Cost Estimate Sheets, it is unclear if this is done consistently as such contingencies should mitigate cost overruns unless there are severely unexpected project scoping/cost estimating issues (discussed in the next section). When estimating the cost for a project there is always uncertainty as to precise asset requirements, how work will be performed, what work conditions will be like when the project is executed, etc. These uncertainties are risks to the project. Some refer to these risks as "known-unknowns" because the estimator is aware of them, and based on past experience, can even estimate their probable costs. The estimated costs of the “known-unknowns” are referred to by cost estimators as the cost contingency. *AACE International,* the Association for the Advancement of Cost Engineering, has defined contingency as "An amount added to an estimate to allow for items, conditions, or events for which the state, occurrence, or effect is uncertain and that experience shows will likely result, in aggregate, in additional costs.” Typically estimated uses statistical analysis or judgment based on past asset or project experience. Contingency usually excludes:

1. Major scope changes such as changes in end product specification, capacities, building sizes, and location of the asset or project;
2. Extraordinary events such as major labor strikes and natural disasters;
3. Management reserves; and
4. Escalation and currency effects.

Some of the project items, conditions, or events for which the project-state, occurrence, and/or effect is uncertain include, but are not limited to, planning and

[9] Maximum “best practice” is typically 15%. Various organizations have lower contingencies such as a maximum 4% and 5% for the State of Washington and California Departments of Transportation, respectively, unless documentation supports an increase. The US Army Corp of Engineers allows 10% contingency on O&M projects.

estimating errors and omissions, minor price fluctuations (other than general escalation), design developments and changes within the scope, and variations in market and environmental conditions. A contingency should be fully incorporated into all but the most basic project estimates, and is "expected to be expended.[10]"

**(3) Project Cost Estimating.**

Effective project cost estimating should be considered a priority; documentation provided indicated that in the Hubbard Lane Widening project (TR4924) the original estimate was over 70% of the revised budget.

An estimate is a calculation of the quantities of various items of work, and the expenses likely to be incurred on the project. The total of these probable expenses to be incurred on the work is known as an estimated cost of the work. The estimated cost of a work is a close approximation of its actual cost. The agreement of the estimated cost with the actual cost will depend on accurate use of estimating methods and correct visualization of the work as it will be accomplished. The importance of correct estimating is obvious. *Estimating is the most important of the practical aspects of engineering construction management*.

The purpose of cost estimating is *to give a reasonably accurate idea of the cost.* An estimate is necessary to give asset owners (e.g. policy makers representing the community) a reasonably accurate idea of the cost to help decide whether the work can be undertaken as proposed or needs to be modified, curtailed or abandoned, depending upon the availability of funds and the prospective direct and indirect benefits. For government works proper sanction has to often be obtained for allocating the required

[10] "Cost Engineering Terminology", Recommended Practice 10S-90, AACE International, WV. 2007

amount. Estimating typically incorporates four distinct areas framed by a thorough understanding of the project scope. These areas include:

1. **Estimating Materials** – In estimating work it is possible to determine what materials and in what quantities will be required for the work so that the arrangements to procure them can be made.

2. **Estimating Labor** - The number and kind of workers of different categories who will have to be employed to complete the work in the specified time can be found out from the estimate.

3. **Estimating Equipment/Supplies** - An estimate will help in determining the amount and kind of equipment needed to completed the work.

4. **Estimating Time** - The estimate of a work and the past experience enables the organization to estimate quite closely the length of time required to complete an item of work and the work as a whole.

Given the importance of knowing the probable cost of a project, accurately estimating materials, labor, equipment/supplies and time is immensely useful and practically necessary in planning and execution of any work.[11] In summary, based on effective project management techniques, the City should strive to consistently adopt estimating techniques that will result in consistent project cost estimations that includes appropriate contingency funding elements. Perhaps exacerbating this issue is that the client departments (e.g. Public Works) regularly perform the cost estimating as opposed to the Engineering Division. Typically, engineering professionals are involved in cost estimating for capital projects. The City should re-evaluate its methods for contingency funding and project management techniques (to be discussed subsequently) to avoid project cost overruns and appropriate project estimates—these fiscal techniques are defined as Cost Engineering. Cost Engineering is the "application of scientific principles and techniques to problems of cost estimating, cost control, business planning and

[11] http://civilengineerlink.com/

management science, profitability analysis, project management, and planning and scheduling." According to the AACE, key objectives of cost engineering are to arrive at accurate cost estimates and to avoid cost overruns. In 2006, AACE published their Total Cost Management Framework (TCMF). The TCMF methodology, while not available under open source licensing, is made freely available online to download at no cost through the AACE website.[12]

***Recommendation: Develop more robust capital project budget estimating to avoid cost overruns and enhance project cost estimating. Training should be provided that is consistent with the AACE Total Cost Management Framework.***

**(3) Project-Based Internal Engineering Charges.**

During the course of this audit, one of the issues with the most significant interest among internal staff, City policy-makers and external constituents using Engineering services was the methods for charging Engineering Division staff work to various capital and development projects. This particular issue will be sub-divided in this report into various topics for purposes of discussion. With respect to the Engineering Division's actual charging practice to capital projects, the following table expands upon a prior matrix, noting what proportion of the budget the Engineering Division has charged based on both expenses to-date as well as total project budget.

[12] TCM Framework: An Integrated Approach to Portfolio, Program and Project Management, 2006, AACE

**Capital Projects Currently Under Design/Construction - % of Budget Expended by the Engineering Division by Category**

| Project | Project No. | Budget Expended | % of Budget Expended - Internal Engineering Charge (Estimate 2009-10) | Project Budget | % of Project Budget - Internal Engineering Charge (Estimate 2009-10) |
|---|---|---|---|---|---|
| Tussing Park Improvements | LB4261 | $ 505,000 | 8.5% | $ 495,000 | 8.6% |
| River Overlook 2 (8th Street SW Quality Feature) | LB4718 | $ 781 | 70.1% | $ 55,000 | 1.0% |
| L Street Sewer & Water Mains Replacement | SE6050 | $ 10,387 | 48.5% | $ 260,000 | 1.9% |
| Fruitdale Trail | TR4719 | $ 162,594 | 3.5% | $ 335,000 | 1.7% |
| Hubbard Lane Widening | TR4924 | $ 561,314 | 15.0% | $ 2,450,000 | 3.4% |
| Sidewalks in Parks | TR4932 | $ 141,245 | 33.5% | $ 192,000 | 24.7% |
| Redwood Avenue LID (Dowell to Hubbard) | TR4934 | $ 11,045 | 42.6% | $ 4,600,000 | 0.1% |
| Bike Lane Striping | TR6028 | $ 40,655 | 11.9% | $ 75,000 | 6.5% |
| Overlays/Maintenance FY 11/12 | TR6031 | $ 432,631 | 3.3% | $ 1,200,000 | 1.2% |
| Midland Avenue Sidewalk | TR6074 | $ 1,888 | 92.8% | $ 110,000 | 1.6% |
| Savage Street Sidewalk | TR6077 | $ 611 | 95.6% | $ 200,000 | 0.3% |
| Water Main in Private Property | WA5028 | $ 3,148 | 58.0% | $ 50,000 | 3.7% |

As shown by the table Engineering staff Division costs range from approximately 3% to 96% (green column) of the monies expended thus far on a project (dependent upon project stage). Additionally, internal charges resulting in costs range from almost non-existent to approximately 25% of the entire project budget (blue column). Determining the appropriateness of these charges is a two-fold exercise:

- The overall proportion of charges is consistent with effective project management protocols.
- The types of charged incurred is consistent with effective project cost allocation practices.

### (3.1) Total Internal Engineering Charges by Project.

With regard to the first bullet, there are a variety of different professional

sources[13] that provide percentage ranges that reflect the proportion of "basic engineering services[14]" that can be charged as well as inspection-related services[15] from the preliminary design phase to the post-construction phase. Broadly, these costs should range from 2.5% to 14% of total project costs, the larger the project (multi-millions) the lower the percentage.

Based on the project listing in the matrices above, there is nothing particularly unusual with respect to the proportion of Engineering Division charges applied to these specific projects with the exception of the 'Sidewalks in Parks' project at close to 25% of the total project budget. Given this sample of active projects, the MCG has no significant issues with the total proportion of time charged to projects.

**(3.2) Engineering Charge Task Types by Project.**

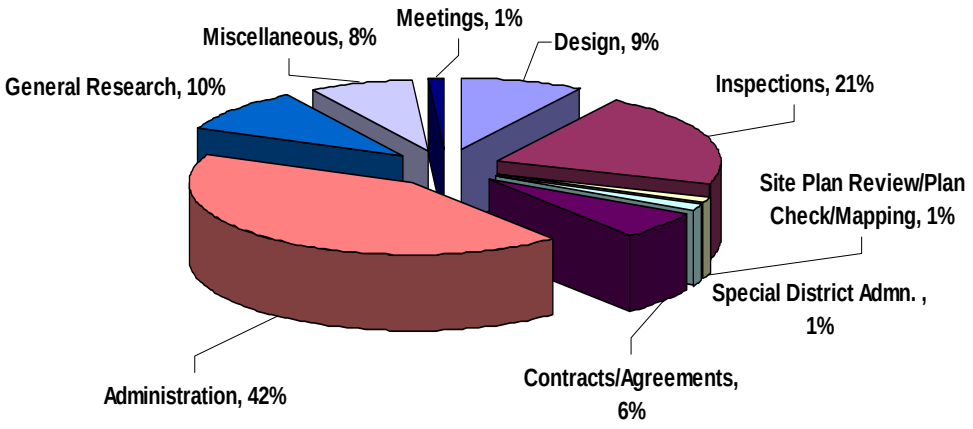
While the total charges to each capital project are generally appropriate, the hours allocated to various project cost allocation task types raises an issue of concern. Based on the projects noted in the above table, hours were captured for all such projects by task type (e.g. design work). The following pie chart shows the proportion of hours expended within each of these tasks.

[13] See report section 3(4) for examples.

[14] Representative basic engineering services include but are not limited to: 1. Services to make measured drawings of or to investigate existing conditions or facilities, or to verify the accuracy of drawings or other information furnished by client entity. 2. Redesigning to reduce project costs to within available funds. 3. Rebidding contracts. 4. Preparing documents for alternate bids. 5. Determining the acceptability of substitute materials and equipment. 6. Services in making revisions to drawings and specifications occasioned by the acceptance of substitute materials or equipment. 7. Evaluating claims by the contractor. 8. Services in connection with preparing and furnishing to the client a set of reproducible Project Record Drawings (As-Built Drawings) showing appropriate record information based on project documentation. 9. Surveying for the purposes of design except sophisticated topographical surveying. 10. Reproduction of reports, drawings, specifications, bidding documents, and similar project-related items.

[15] Inspection services ensure that the construction project is properly and adequately inspected. As part of inspection duties, an inspector position reports and records, at a minimum, the following information: project name, contractor's name, date, weather conditions, contractor's work force (indicating work classifications), equipment (in use or idled), quantities of pay items installed, deficiencies in materials or work, general observations, summary of construction activities, and signature of inspector.

**Active Projects - Engineering Allocation of Time by Task Type**




As shown by the pie chart, 30% of hours are allocated to design and inspection services—core business associated with developing and managing projects. There is, however, an inordinate amount of time dedicated to "Administration," "General Research" and "Miscellaneous" tasks totaling 60% of charged time to these projects. While this is most likely a function of less than ideal record keeping by Engineering Division personnel combined with very general work tasks, it does illustrate an issue associated with how time is spent on projects, regardless of whether the time is warranted or not. While overall staffing needs is discussed later in the report, there is clear indication that time charged to projects needs to be better defined.

According to the American Society of Civil Engineers (ASCE) in one of there publications, a capital project can be defined in a reasonable number of work stages, phases, tasks or categories. These include: 1) Planning and Scoping, 2) Design Development, 3) Design Survey, 4) Design Administration, 5) Construction Survey, 6)

Construction Inspection, 7) Construction Management, and 8) Project Closure. These ASCE definitions are far more informative than many of the current Grants Pass Engineering Division task definitions noted above. As a consequence, these ASCE project task categories, or other similarly informative task-based events, should be adopted to track internal Engineering Division time to both capital and development projects.

***Recommendation: Re-design Engineering Division project time tracking to include ASCE task categories noted in this report and eliminating such generic time tasks as "Administration," "Miscellaneous," and "General Research" which appear overused. These ASCE tasks can be augmented but tasks should be informative as to what duties and responsibilities are accomplished.***

## 3. PROJECT DEFINING – ENHANCED PLANNING AND SCOPING ACTIVITIES.

Important project initiatives should be adopted and formalized when managing annual CIP projects and the overall Five-year Capital Improvement Program. The effective project defining, scoping, prioritization and other initial project steps are tantamount to appropriate planning and organizing the Capital Improvement Program. Planning of the capital projects identified in a CIP is essential to the development of a workable approach to completing these projects on schedule and within budget. Key development requirements for management of the process include the definition of each capital improvement project through the completion of a design authorization form; more formalized selection of design consultants; the preparation of a detailed work schedules for the project in question (using Microsoft Project or similar software); the projection of staffing requirements to handle major planned and priority projects; and the "leveling" of these staffing requirements to assure the work does not exceed staff capacity.

Engineering Division staff performing CIP project management duties should be held accountable for the effectiveness of the project management of capital projects to which they have been assigned through the *consistent use of formalized and informative project management tools*. Further, they should be held accountable for monitoring the planned versus actual schedule and budget for their assigned projects, including:

- Implementing initiatives to accomplish Capital Improvement Program projects on schedule and within budget;
- Assuring that all project plans and schedules are well defined as part of the planning and scoping of a capital project prior to commencement of design;
- Monitoring and reporting progress and problems in meeting capital project plans and schedules; and
- Managing and coordinating interfaces between various staff of the Division and "client departments and divisions" within the City.

The project manager, from the beginning of the project to its final conclusion, should participate in the fulfillment of the responsibilities listed above. This is a concept of "cradle to grave" project management. According to the PMBOK Guide, a project manager is "the *individual* (emphasis added) responsible for managing a project." Consequently, best practices suggest that one individual should be assigned the role of project manager in all projects, and that individual should be fully engaged in the project from beginning to end, and held accountable for the project's completion on time, within budget, and at the expected performance level. Because the infrastructure needs of the City are important, the sophistication of the management of capital projects used to address infrastructure needs should be presently augmented. As such, the following

### (1) A "Design Authorization" Project Planning Form Should Be Completed Before Commencement of Design.

Design of a project should not be initiated until the "who," "what," "where," "why" and "how" of the project is formally defined. In brief, all necessary resources required (staff hours and construction funding) and the appropriate steps for completing the project should be identified using a design authorization form. The design authorization form should be approved by all relevant parties to include Engineering, the end-user (e.g. Public Works) and, as necessary given project size the City Council or representing sub-committee. The City presently provides information in the *Adopted Capital Budget Fiscal Year 2010-11* and separately in an Engineering Division Cost Estimate process in lieu of the noted design authorization project planning form. An abstract of this cost estimate form is noted in the exhibit below:

## Exhibit – Cost Estimate Form (Abstract)

**ENGINEERING DIVISION COST ESTIMATE FOR**
**TR4934 – REDWOOD AVENUE IMPROVEMENTS (DOWELL ROAD TO 450' WEST OF HUBBARD LANE)**

1 **Request for Proposals (RFP's)** **Estimated cost for Task 1: $4,000**

a. RFP Document Preparation
b. Review of Proposals
c. Selection of Engineer

2 **Coordination with Designer** **Estimated cost for Task 2: $12,000**

a. Notice to property owners / residents explaining project scope and to expect design professionals to be in the area
b. Internal preliminary kickoff meeting
c. Initial startup meetings to begin design work
   I. Identification of right-of-way (ROW) by City Surveyor
   II. Project site visits
   III. Identify access issues
   iv. Misc. questions from designer
d. Provide all City data available
   I. As-Builts
   II. Topo
   III. Standards
e. Provide design parameters
   I. Street widths
   II. Sidewalks (curb tight vs. landscape strips / swales)
   III. Impact to trees
   iv. City utility standards
   v. Asphalt section
   vi. Striping plan
   vii. Bike lanes (Yes or No)
f. Research / Discuss design anomalies and provide recommendation to design engineer
   I. Site visit if necessary
g. Review contract change orders
   I. Determine impact to project
   II. Determine impact to budget
   III. Approve/Deny
h. Review reports and provide recommendations
   I. Geotech
   II. Environmental studies and Impact
   III. Traffic impact analysis
I. Review permit applications
   I. Josephine County Public Works
   II. DSL
   III. Army Corps of Engineers
   iv. Cross-Cutter Requirements

3. **Plan Review** **Estimated cost for Task 3 : $8,000**

a Log in and distribute plans for review comments
   I. 30% Review
      - 1st Review
      - 2nd Review
      - 3rd Review (if necessary)
   II. 60% Review
      - 1st Review
      - 2nd Review
      - 3rd Review (if necessary)

**EXHIBIT "D1"**

While the cost estimate form provides relevant information, it is not entirely comprehensive. The ideal design authorization form should include the components enumerated below.

- The project title, including the phase of the project, if relevant.
- A general project description, including a narrative summary description of the project, specific physical improvements included, the location of the project, and the relationship to utility master plans, transportation master plans, the 5-year capital improvement program, etc. The priority of the project with respect to other capital projects planned, why the project is listed at such (high/lower) priority and the expected short and long-term outcomes if the project does not move forward.
- The capital project number (as noted in the five-year capital improvement program).
- The financing and cost, including the source of funds and appropriation status.
- A budget covering the project management or design staffing, survey staffing, construction inspection staffing, appropriate consultants, property acquisition, utility relocation, etc., by major expenditure component.
- The responsibility for completing the various components of the capital project such as the following:
  - Design by in-house staff or by consulting engineer;
  - Construction inspection by in-house staff or by consulting engineer;
  - Design survey and construction staking by staff or consulting engineer;
  - Materials testing required;
  - Environmental evaluation required;
  - Right-of-way acquisition required and, if so, the number of parcels and their locations and assessor parcel numbers;
  - Utility relocations that need to be relocated, problems with relocation and timing issues; and

  - Other key responsibilities that need to be assigned and/or accomplished.

- The extent of coordination necessary, listing the inter-agency coordination by division, department, or outside agency with whom coordination will be required in the design and construction of the capital project, (e.g., Utilities) the nature of the coordination, and the key contacts.

- The preliminary schedule for completing the design and construction of the capital project including the schedule for design, bid package preparation, advertise/award, right-of-way acquisition, environmental impact reports, and construction and including the dates of important events such as approval of the award of the construction contract by the City Council.

- A change management plan or procedure that includes a documented, systematic approach to the handling of construction change orders. This should include the mechanisms that would be employed to control scope creep, schedule changes, changes in deliverables, technical changes, etc.

- Staffing levels required throughout the design and construction phase, including the estimated staffing required in terms of person hours required for design and construction inspection utilizing the cost of construction or other relevant guidelines.

- Design and construction reporting requirements, including cost and schedule control procedures.

- A risk assessment to identify the risks or threats associated with the execution of the project, the response strategy, and how the risk would be monitored and tracked.

- Design considerations or issues related to the capital project such as complexities of the design.

- Community relation and public information requirements including public hearings or meetings and how the public will be informed and involved in the preliminary design and informed about the progress of the design and construction. Additionally, a communications plan should be prepared for external and internal communication regarding the project including the responsibilities and mechanisms for the communication and when the communication should occur.

- Identification of the roles and responsibilities of the project team members during the design and construction management of a project. Ideally this should link actual positions (and personnel assignments) to the project for planning purposes. Illustrative roles and responsibilities, for example, during the design of a project are presented below.

– City Engineer:

  - Provide leadership and oversight for delivery of the design program;
  - Reviews the status and delivery plans for projects;
  - Engineer of record for contract plans; and
  - As the design of the project progresses, set goals and provide advice and guidance.

– Project Supervisor:

  - Coordinate design operations and incorporate products from other groups (i.e. Public Works, etc.) to the design file and plans, specifications, and estimates;
  - Design oversight including meeting the requirements of the design specifications;
  - Provide technical advice regarding individual design elements;
  - Bring concerns from the design staff to the management team; and
  - Maintain the project schedule.

– Project Supervisor/Project Specialist:

  - Project manager for the project;
  - Liaison between the project delivery team and the management team;
  - Work with consulting engineers and construction contractors to resolve any issues or roadblocks;
  - Monitor the schedule and budget; and
  - As the project progresses, set goals and provide advice and guidance;
  - Assist with the preparation of the design file and plans, specifications, and estimates;
  - See that the design meets the requirements of the design standards used by the City;
  - Provide information, as needed, to specialty groups (i.e., Public Works, etc).

– Project Specialist:

  - Provide construction inspection and management of the capital project to assure the project is built to plans and specifications, the number of change orders are minimized, the construction adheres to schedule, etc..

• The measures of success for the project in terms if what the team must

accomplish for the project to be successful and the measures of success for the team (e.g., bringing the project in on schedule and on budget).

- How the quality of the project will be achieved including the standards, methods of verification that standards are met during construction, constructability reviews during design, maintenance review during design, etc.

- How the project will be transitioned to Construction and Maintenance upon completion of construction and how the project will be closed out upon completion of construction (e.g., as-built designs, archiving of records, acceptance of work completed by the construction contractor, etc.).

The project planning document provides an opportunity to develop a clear understanding of the project including the purpose, goals, budget, schedule, etc. The aforementioned level of detail reflects a "best-practice" approach to project planning; a simplified derivative may be more practical in Grants Pass. Furthermore, the depth of the project plan needs to recognize the size and scope of the capital project. Small capital projects (i.e., estimated construction cost of $100,000 or less) should be based on simpler project plans than that noted above.

***Recommendation: The Engineering Division should prepare a Design Authorization project plan before the commencement of the design of a capital project.***

**(2) Further Formalize Design-related Decision-making.**

The determination for using consultants versus in-house staff as well as the selection process for design agreements and engineering consulting services requires additional formality. According to information provided by the City, when a capital project is in need of design the following considerations are made:

- What is the timing of the design? Does the project design need to be completed within the short-term or is a longer period satisfactory?

- How many hours will the project take to design using internal resources given their particular experience and expertise? Is such in-house design possible?

- Which staff can re-arrange their priorities to devote the necessary staff hours to complete the design?

- Is the project of sufficient size and complexity that warrants an outside engineering firm's assistance?

While these questions are relevant, there is currently no formality surrounding the documented response to these questions. As noted previously, there is no 'Design Authorization Planning Form' to help frame a response to these important inquiries. While client departments prepare some project prioritizations that may help determine use of in-house versus contracted staff, there is no formalized risk assessment leading to these priorities or policy-maker directives approving such priorities. As such, there is no formal "high or low" priority to determine how either internal or external resources should be used. Outsourcing alternatives with respect to environmental, design, etc., are done on a project-by-project basis using internal staffs' "professional expertise and judgment." There are no written criteria employed to determine those projects that are designed by in-house staff versus those designed by contract engineers. There is no written criteria how a consultant will be selected based upon specific and weighted variables. As a consequence, a review of the selection process for design agreements and consultant services is not grounded on any principles that are currently documented. As such, the MCG recommends development of formal, written criteria that defines:

- Decision points that definitively determine whether in-house staff or consultants will be used for design services (e.g. design requires P.E. involvement; estimated design cost exceeds $15,000 in professional time).

- Documented process for selecting design consultants. A documented pre-qualification process is used for contractors with forms available on the Engineering Division's website; there is a similar pre-qualification for design consultants done through an RFQ selection process. Nevertheless, the variables

used and a formalized scoring system to determine which design consultant will be selected based on specific written criteria are presently not available. This should be rectified.

While current processes with respect to design-related decisions are not egregious, there is opportunity for improvement through further formal protocols.

***Recommendation: Formalize through a documented procedure a decision-making process for determining use of in-house staff versus private consultant on engineering design projects.***

***Recommendation: Formalize through a documented procedure how design and other engineering consultant are selected. Provide criteria for selection with formal weightings for each criterion. Maintain formal scoring/selection sheets of hired consultants in project files.***

**(3) The Engineering Division Should Prepare a Resource Loaded Project Schedule for Each Fiscal Year.**

Before the beginning of each fiscal year, the Engineering Division should prepare a resource loaded project schedule for all of the capital projects that will be designed and inspected during that fiscal year. While the prior Cost Estimate Form exhibit has elements of resource loading, there is no nexus between this and other project for planning purposes. The intent of the resource loaded project schedule is to make sure that sufficient staff or consultant resources are available to complete these capital projects or, if not, to adjust schedules to accommodate the resources available. This analytical effort would need to be completed for each project that would be designed or inspected during the fiscal year. The total staff hours would need to be loaded on a project-by-project basis for the months that the project will be designed or inspected during that fiscal year (although the project could extend beyond the end of that fiscal year). Information abstracted from the Design Authorization Form can be used to assist in preparation of this documentation. Estimates of hours required should be based upon cost of construction guidelines discussed in a following section.

***Recommendation: The Engineering Division should prepare a resource loaded project schedule for all of the capital projects that will be designed and inspected during that fiscal year.***

### (4) A Summarized Twenty-Four Month Bar Chart Schedule Should Be Prepared for All Capital Projects.

In order to facilitate the nexus between various projects as well as assist in shorter-term capital project planning, additional project scheduling tools that are graphically based should be developed. Presently, shorter range information displayed on projects is located within the *Adopted Capital Budget Fiscal Year 2010-11* in narrative and table format, an abstract from that document is in the exhibit below:

**Exhibit – Capital Project Information (e.g. Scheduling Table).**

## Capital Improvements – Wastewater Projects

Project SE6055 5th Street Sewer Main lacement RR Tracks to 'C' Street

**Project Description**
This project will replace approximately 1300 linear feet of severely deteriorated sewer line on 5th Street from the north side of railroad right of way to 'C' Street. 8" sewer lines will be stubbed out to the alleys from the main line in 5th Street.

**Need for Project**
A recent TV inspection of the sewer main in 5th Street revealed severely deteriorated pipe (multiple cracks, holes and missing pipe).

**Estimated Total Project Cost: $280,000**

**Resources**

| | Actual Through FY'09 | FY'10 Revised | FY'11 Recommend | Through FY'11 | FY'12 Projected | Future | Total Project |
|---|---|---|---|---|---|---|---|
| Wastewater Capital Projects | | | | 245,000 | | | 290,000 |
| | | | | 0 | | | 0 |
| | | | | 0 | | | 0 |
| Total Resources | | | | 245,000 | | | 290,000 |

**Requirements**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Expenditures | | | | 245,000 | | | 290,000 |
| Transfers/ Contingency | | | | 0 | | | 0 |
| Ending Balance by Year | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Requirements | | | | 245,000 | | | 290,000 |

Planning information is marginal in this document, and none is graphically based. A 24-month Gantt schedule should portray start and finish dates for each capital project by simple activity descriptions such as those for design, bid package preparation, advertise/award, right-of-way acquisition, environmental impact evaluation, and construction. This schedule should be prepared for all assigned/approved capital projects during the next twenty-four months based upon existing projects underway or those noted in a future adopted five-year capital improvement program. Ideally, a Master Gantt chart should be prepared showing all projects within the 24-month planning horizon as well as individual bar charts for each project. The graphic should be updated on a quarterly basis.

***Recommendation: Implement a 24-month capital project Gantt Bar Chart with milestone highlights to facilitate capital project planning. Update these products quarterly.***

**(5) ASCE and Other Guidelines Should Be Utilized to Document Project Resource Requirements for the Design and Inspection of Capital Improvement Projects.**

The City Engineer and the assigned project managers should determine the staffing requirements for each project in terms of person hours required for design and construction inspection utilizing the cost of construction or other similar guidelines noted herein. The guidelines should not be "blindly" utilized as they will need to be adjusted to the local circumstances. These guidelines do, however, provide a method for allocating limited resources to various scheduled projects and can ultimately determine if additional in-house or contracted resources are necessary and/or project delays required. As noted in a prior Cost Estimate Form exhibit, costs are estimated for

projects are accomplished, yet the City does not use formal ASCE or other guidelines and largely relies on “experience.”

Project staffing guidelines can be developed based upon data developed by the American Society of Civil Engineers (ASCE) in their publication entitled, *Consulting Engineering: A Guide for the Engagement of Engineering Services*. The ASCE publication stated that the percentage of construction cost “has been widely used for determining the compensation of consulting engineers on assignments where the principal responsibility is the design of various works, and the preparation of drawings, specifications, and other contract documents as necessary.” To that end, the following chart was developed by ASCE to reflect an estimated proportion of construction costs devoted to various design, construction, inspection and related project management services.

**ASCE Allocation of Staff Resources for Design, Construction and Inspection Activities as a Median Percentage of the Net Project Construction Costs**

| Type of Project | Street Construction | | | | Street Reconstruction | | | | Traffic Control | | Water and Wastewater | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Level of Complexity | Above Average | | Average | | Above Average | | Average | | Average | | Above Average | | Average | |
| Construction Cost (+/-) | $0.25 million | $1 million | $0.25 million | $1 million | $0.25 million | $1 million | $0.25 million | $1 million | $0.25 million | $1 million | $0.25 million | $1 million | $0.25 million | $1 million |
| Planning and Scoping | 0.5% | 0.5% | 0.5% | 0.5% | 0.5% | 0.5% | 0.5% | 0.5% | 0.5% | 0.5% | 0.5% | 0.5% | 0.5% | 0.5% |
| Design Development | 10% | 8% | 9% | 7% | 13% | 11% | 10% | 8% | 8% | 6% | 9% | 8% | 8% | 6% |
| Design Survey | 1 ½% | 1% | 1 ½% | 1% | 1 ½% | 1% | 1% | 0.5% | 1 ½% | 0.5% | 1% | 0.5% | 1% | 0.5% |
| Design Administration | 2% | 2% | 1 ½% | 1 ½% | 2% | 2% | 1 ½% | 1 ½% | 1 ½% | 1 ½% | 1½% | 1½% | 1 ½% | 1 ½% |
| Construction Survey | 3% | 2 ½% | 2 ½% | 2% | 2% | 1 ½% | 1 ½% | 1% | 0.1% | 0.1% | 2½% | 2% | 2½% | 2% |
| Construction Inspection | 5% | 5% | 4% | 4% | 5% | 5% | 4% | 4% | 3% | 3% | 4% | 4% | 4% | 4% |
| Construction Management | 3% | 3% | 2% | 2% | 3% | 3% | 1 ½% | 1 ½% | 2% | 2% | 3% | 3% | 2% | 2% |
| Project Closure | 0.4% | 0.1% | 0.4% | 0.1% | 0.4% | 0.1% | 0.4% | 0.1% | 0.4% | 0.1% | 0.4% | 0.1% | 0.4% | 0.1% |
| **Total** | **25.4%** | **22.1%** | **21.4%** | **18.1%** | **27.4%** | **24.1%** | **20.4%** | **17.1%** | **17%** | **13.7%** | **21.9%** | **19.6%** | **19.9%** | **16.6%** |

The following points should be noted concerning this cost of construction guideline.

- These guidelines have been developed to fit the different types of construction jobs such as street construction, road reconstruction, wastewater, and water.

- Two different levels of complexity are noted: average and above average. An above average level of complexity should be based upon the need to deal with other agencies, such as a state Department of Transportation, the design complexities of the project, or problems with planning and construction.

- Estimates are provided for projects in the $250K range (to one million) and projects over $1M in construction costs. Projects less than $250K can be difficult to estimate given their small size (and potential disproportionate resources necessary to design/inspect). Additionally excessively large projects exceeding the tens-of-million dollar range are also difficult to estimate.

- These guidelines were developed to estimate the costs involved in the different types of work activities in each capital project. These include planning and scoping, design development, design survey, design administration, construction survey, construction inspection, construction management, and project closure.

- The guidelines are expressed as a percentage of construction (e.g., the cost of staffing as a percentage of construction costs). To determine the estimated number of staff hours required for a work activity, multiply the construction costs by the percentage for that activity, then, divide the resultant by the fully loaded hourly costs, including all multipliers, of the engineering/inspection positions involved. Ideally, use of the hourly cost for a consulting engineer/inspection position (as opposed to fully loaded hourly rates) will level the playing field and ensure that the City's staff are as productive and held as accountable as consulting engineers. Additional "bureaucratic" tasks associated with working for the public sector can be considered when calculating net annual availability (total professional work hours available) for each position.

Based upon the guidelines provided by the ASCE, a framework could be established related to the number of professional engineer positions required and inspectors required given the construction program value.

In addition to the ASCE matrix a more recent study performed in January 2008 by the Association of Professional Engineers and Geoscientists of the Province of

Manitoba (Canada) and the Consulting Engineers of Manitoba, Inc. developed a readily available guide with the following major characteristics.[16]

- A percentage of the costs involved for the entire project (as opposed to construction costs only) are developed for discreet functions. These percentages are influenced by the complexity of the project categorized in three possible areas: Basic, Complex I and Complex II.

- The discreet functions represent the suite of design services and contract administration / project management services that are provided.

- Dependent upon project cost and complexity, costs associated with the design and contract administration services can run 6-14% of total project costs for smaller projects (~$500K to $5M) to 2-1/2% to 10% for larger projects (~$25M).

Both tools noted herein can be used to provide staffing estimates in the future. The project managers within the Engineering Division should determine the staffing requirements for each project in terms of person hours required for design and construction inspection utilizing the cost of construction guidelines. This should be accomplished in the preparation of the project scoping plan. Engineering staff should utilize the cost of construction guidelines in the preparation of the staffing requirements before the beginning of each fiscal year to determine workload capacity of staff versus the workload represented by the capital projects.

***Recommendation: The Engineering Division should utilize more formal cost of construction guidelines (e.g. ASCE) to determine the staffing requirements for each capital improvement program project in terms of person hours required for design and construction inspection.***

**(6) A Design Report Should Be Completed When the Design of Major Capital Project Is No More Than 10% Complete.**

The technical staff assigned to the design of the capital project in the Engineering Division should be responsible for preparing a design report (project evaluation and

[16] http://www.cemanitoba.com/PDF/GuideJanuary2008.pdf

alternatives study) for major capital projects. If a consulting engineer is completing the design of the project, then the consulting engineer would prepare this design report.

The design report should be prepared when the design is not more than 10% complete. The purpose of the design report is to serve as a preliminary design review to enable the staff assigned to the design to review the proposed design approach with the City Engineer and primary customer. More specifically, the design report should:

- Briefly identify the capital project and describe the project;
- Provide a background to the project including project history, whether the project has any outside support or opposition, and whether any commitments regarding the project have been made;
- Define the problem the capital project is intended to solve and the alternatives considered that could possibly solve all or a portion of the problem;
- Outline the detailed scope of the project and the reasoning behind the selection of any alternative utilized for the design and other engineering decisions;
- Outline in detail the design criteria used for the capital project and the rationale for those criteria; and
- Set forth the detailed construction costs for the capital project based upon a detailed review of expected problems and the completion of 10% design, and the sources of funding.

Upon completion of the design report, a portion of the data which can be duplicated from the Design Authorization Project Planning Form previously discussed, the engineering staff assigned to the design of the project in the Engineering Division should schedule a preliminary design review meeting. The project engineering staff assigned to the design as well as other relevant parties (e.g. end-user) should attend this meeting.

At this meeting, the project engineer assigned to the design should briefly review the project, the alternatives selected, the selected alternative and why this alternative

was selected, the design and construction cost estimate, special problems not resolved, the project schedule, and the staffing requirements (or consulting engineer firm) needed to complete the design and construction management. Presently, Grants Pass does not perform any of these functions in a consistent and formal manner.

***Recommendation: The project engineering staff assigned to the design of a project should complete a design report for each significant and complicated capital improvement project when the design is no more than 10% complete.***

## 4. PROJECT MONITORING AND REPORTING ADJUSTMENTS.

Engineering Division assigned project managers should be required to assess and report the financial and scheduling status of each project on, at minimum, a quarterly basis and ideally a monthly basis. The project manager should be able to report meaningful information in various types of status reports noted below.

### (1) Prepare a Periodic Capital Project Status Report.

Currently, there are no formal project status reports developed for the project end-user by the Engineering Division. Status is communicated verbally and by other forms of communication such as email but rarely in "report" form. Engineering should prepare a periodic narrative[17] statement regarding each capital project no later than the fifth working day of the month. Best practices suggest client agencies that are receptive to such information should receive this information on a monthly basis although quarterly reporting is acceptable. The following information should be included in this status report.

- Capital project number (based upon the number assigned in the six year capital improvement program);
- The capital project name;

[17] Although the project team recommends monthly, some organizations believe quarterly reporting is satisfactory.

- The project manager or construction inspector assigned to the project (or the consulting engineer);

- A comparison of actual project costs to date versus planned including

  – Design budget;

  – Design expenditures to date separately identifying staff expenditures from consulting expenditures;

  – Construction management expenditures to date separately identifying contract administration, construction inspection, and consulting engineering expenses;

  – Construction cost as budgeted; and

  – Current construction cost as estimated by the project manager responsible for construction management.

- A comparison of actual project schedule to date versus planned including:

  – The date the design was scheduled to begin and actually begun;

  – The date the design was scheduled to finish and actually finished;

  – The date the City Council was scheduled to award a contract for the construction versus the actual (or new estimated date);

  – The date the construction was scheduled to begin and actually begun; and

  – The date the construction was scheduled to finish and actually finished.

  – The current status of the capital project containing explanations such as 30% design complete.

These should be simple reports to avoid lengthy preparation time as well as significant review time on the part of the client department. Engineering, as practical, should publish these reports monthly, on-line on the Intra- or Internet.

***Recommendation: The Engineering Division should prepare a periodic capital improvement program project status report.***

***Recommendation: The periodic capital improvement program project status report should be updated and posted to the City's web site.***

**(2) A Final Report Should Be Prepared on Completion of a Capital Project**.

Without a formal analysis and distribution for review, the mistakes and weaknesses of one project will almost certainly be repeated on other projects. The final report should focus on analyzing the good and bad aspects of the completed project, transmitting that information to the staff of Engineering and client departments, and providing a convenient summary of the project. Indeed, such major project de-briefing is an appropriate professional philosophy that should be strategically implemented, as practical, throughout the City regardless of the profession.[18]

At the completion of the project, the project manager assigned to the project should complete a final report including:

- Project name, project number, and a description of the project. Construction costs – planned versus actual with an identification of all of the change orders and the reasons for those change orders;
- The staff hours allocated to the project - planned versus actual;
- The schedule for completion of the project - planned versus actual including whether drawings, specifications, schedules, and cost estimates were prepared consistently according to schedule;
- The design costs for the project - planned and actual;
- Construction management costs - planned versus actual;
- Whether as-built plans have been completed;
- Whether the project at completion met the value expectations of the client including a customer satisfaction survey completed by the client that identifies such issues as construction cost versus value, responsiveness to the client, ease of maintenance, usability, and the like; and

[18] By example this approach could be taken with Information Technology projects, major law enforcement community policing initiatives, etc.

- Comments and discussion regarding the project as necessary including unusual conditions encountered during the project such as contractor deficiency, quantity difference, scope change, etc.

This report should be circulated to the other project managers, the City Engineer, the Director, and the client department. After distribution of this status report, it should be the basis of a de-briefing meeting with the client department to discuss "lessons learned."

***Recommendation: The Engineering Division should prepare a final "lessons learned" project close-out report.***

**(3) A Rating System Should Be Developed and Utilized to Evaluate the Performance of Each Consulting Engineer Utilized on City Construction Projects.**

The Engineering Division should develop a formal evaluation mechanism that rates each consulting engineer's performance as part of the close-out of each construction project. The consulting engineer's performance should be evaluated on factors such as:

- Ability to complete the project on schedule;
- Ability to complete the project within the established budget;
- Whether as-built documentation is provided and is accurate and thorough;
- Timeliness of communications to staff, including periodic status reports and early identification of potential issues that would impact the projects completion on time or within budget;
- Ability of engineer of record to perform the assigned duties within the budget agreed upon for professional services fees; and
- Quality of documentation provided on projects.

A simple rating scale should be applied to each factor rated, such as exceeded expectations, met expectations, and below expectations. An overall rating should be

applied and any consulting engineer's performance that receives an overall rating of below expectations should be addressed.

***Recommendation: The Engineering Division should prepare a consulting engineer project close-out rating sheet.***

### (4) A Rating System Should Be Developed and Utilized to Evaluate the Performance of Engineering on City Construction Projects.

Similar to the above, a rating for in-house Engineering Division staff should be developed as a tool for accolades and future improvement opportunities. This form would be filled out by participating client departments.

***Recommendation: The Engineering Division should prepare an "in-house" engineer project close-out rating sheet.***

## 5. PROJECT MANAGEMENT REQUIREMENTS SUMMARY.

Based on the above project management improvement opportunities, the following exhibit summarizes the large majority of initiatives that should be considered when managing capital projects.

## Exhibit - Management Requirements For Capital Projects

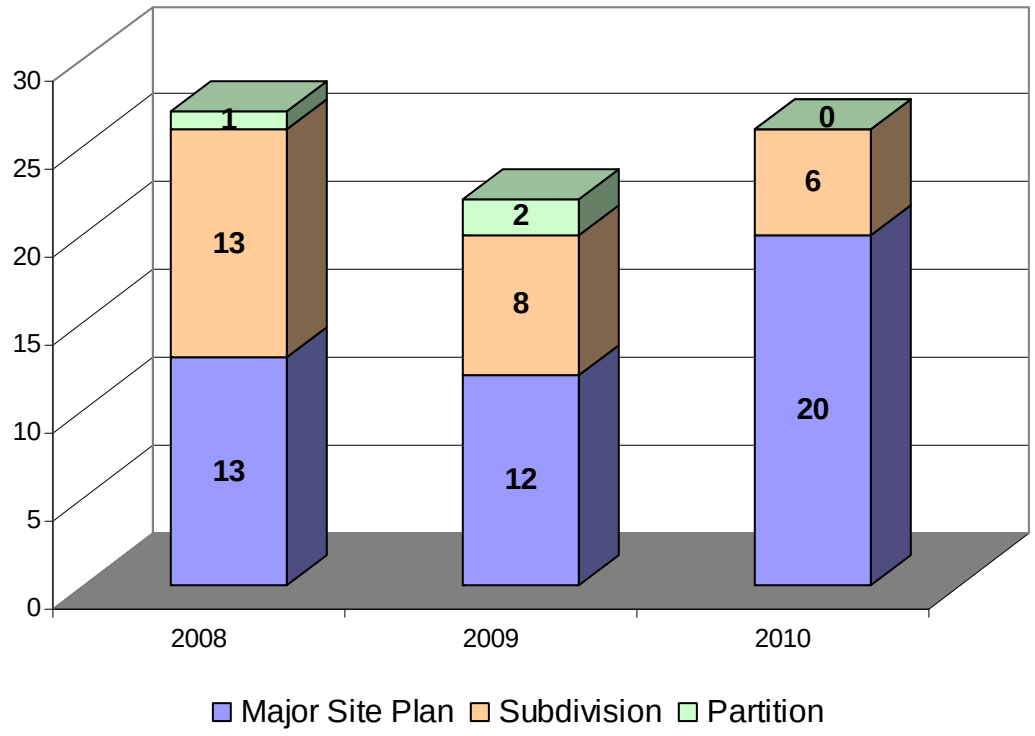
| Component of the Capital Improvement Process | Requirement |
|---|---|
| Planning and Organizing the CIP | Preparation of project scoping plan for each CIP project to define the financing, description, scope, design considerations, and the necessary coordination with outside agencies. |
| | Preparation of a network schedule for each project, including duration time for each task, and earliest and latest start and finish times. |
| | Preparation of bar chart schedules for the entire CIP for a 2-year period showing projected timing of planned projects by major project component (e.g., design, bid, award, construction, etc.). |
| | Projection of staffing requirements to handle planned, prioritized projects for next fiscal year, including workload loading on a monthly basis. |
| | Leveling of resources to enable the development of schedules based on available staffing. |
| Project Management | Management of capital improvement projects in accordance with the project scoping plan approved by the capital project owner. |
| Project Monitoring and Reporting | Reporting via the time accounting system of actual staff-hours by skill level and position type on CIP projects to provide the basis for:<br>• Monitoring of staff and contractor performance against guidelines during each phase of the process.<br>• Monitoring actual versus projected staff needs.<br>• Development of a database to utilize in refining project workload estimates.<br>Time accounting system includes an hourly rate that accounts for indirect time and section-wide overhead. |
| | Reporting of the project status on a monthly basis, including status of staff hours planned vs. actual. |
| | Reporting of financial and schedule status of each project showing expenditures and schedule to-date versus the project scoping plan. |
| | Recommending within the monthly status report steps that can be taken to enable completion of projects on schedule. |
| | Communication to top management, within the monthly status report, of CIP projects that will not be completed on schedule and within budget, along with estimated completion dates for each of these projects. |

***Recommendation: Implement the variety of Project Management practices identified in this report to either augment or replace existing Engineering project management methodologies.***

## 6. DEVELOPMENT REVIEW PROCESS.

The Development Review process in Grants Pass has recently represented a minor proportion of workload for the Engineering Division. The following bar chart shows the number of plan checks performed, by type, for the last three years.

**Development Review Plan Check Work Volume - 2008 -2010**




The above represents 75 individual plan checks over three years, or 1.7 total plan checks on average for each individual project. With respect to time dedicated to developer efforts, 569 hours were associated with varied tasks to include 61.5 hours for (above) plan check services and, given recording practices, a possible portion of 49.5 hours of General Research. Given 26 different development review plan checks in

2010, this reflects approximately 2.5 to 4 hours average per plan check which is reasonably efficient performance.

**(1) Development Review Effectiveness - Publication of Guidelines.**

With respect to best practices effectiveness, the extent of development review applications deemed incomplete by the Engineering Division after the initial application review should be no more than 25% to 33% of initial submittals. In essence, this would result in approximately 1.3 plan check per major site plan, subdivision, or partition review. Given plan checks average 1.7 reviews per individual project, this provides some opportunities for further improving developer performance (as opposed to engineering staff performance). This can be achieved through comprehensive and well-publicized guidelines that are readily available in various formats. By example, the Engineering Division should develop application guides for all of the permit types processed during development review and should identify the submittal requirements necessary for an applicant to achieve a complete submittal. Examples of the application submittal requirements for grading plan check that should be included in a checklist are illustrated below.

- All Grading Plans shall be prepared on 24” x 36” size sheets.
- Include the legal description, site address and assessor's parcel number of the property on the plan.
- Label all property lines on the plan or in the legend.
- Show all property line distances and bearings.
- Plot, label and dimension all existing and proposed easements on the plan. Also show any existing or proposed utilities located within these easements or near the site.
- Include a vicinity map showing the site location.

- Include a legend on the plan.
- Show a north arrow on the plan which should point toward the top of the sheet whenever possible.
- Show cut and fills private drainage system, brow ditch, gutter, slope landscaping, and other related quantities on the plan.
- Show the scale of the plan. The scale shall be a graphic bar-type, 1/4" wide and 4" long to accommodate future plan reduction.

While Grants Pass has similar conditions noted in their Grants Pass Development Code (Article 19) located at a sublink at http://www.grantspassoregon.gov/Index.aspx?page=404 , it is very difficult to locate and is embedded within the scope of Article 19. Such conditions should be readily publicized and easily accessible to enhance the development review process.

***Recommendation: The Engineering Division should develop application guides for each of its engineering permits including grading permits, parcel maps, tract maps, public improvement plans, etc. that are readily available in easy to read formats. The Engineering Division should publish and prominently display the engineering permit application guides to its web site.***

**(2) Development Review Effectiveness - Proactive Communications.**

The Engineering Division should be proactive and periodically meet with consulting engineers and developers who prepare applications for submittal to the Division and discuss development review requirements. As part of this training, the staff should identify for consulting engineers and with developers the most common factors that delay project plan approvals. These discussions should also occur after each submittal when consulting engineers are involved in the development of the application and when particular problems are encountered meeting submittal requirements. The training of the consulting engineers and developers should be viewed as an ongoing

responsibility. The intent is to prevent a recurring pattern of incomplete submittals as it is in the Division's best interests to educate applicants, make them aware of how the City interprets regulations, provide them with examples of acceptable work, and otherwise help them navigate the process.

In addition to the above, the Engineering Division should publish on a regular basis "Client Assistance Memos" to its web site and e-mail these Client Assistance Memos to consulting engineers, contractors, and traffic engineers that subscribe to these documents. These "Client Assistance Memos" should be designed to provide user-friendly information on the range of permitting, engineering permit and standard specification compliance policies and procedures that an applicant may encounter while conducting business with the City. For example, "Client Assistance Memo's" could include such topics as the following:

- Grading and retaining wall construction near or adjacent to property lines;
- Steps to an approved traffic impact study;
- Making sense of the City's grading, stormwater, and drainage control regulations;
- Land survey requirements;
- Getting an over-the-counter engineering permit; and
- Construction and development in the floodplain.

The development of these Client Assistance Memos should be based upon the most frequent corrections encountered during plan check, and in consultation with contractors and engineers.

***Recommendation: The Engineering Division should publish on a regular basis "Client Assistance Memos" to its web site and e-mail these Client Assistance Memos to consulting engineers and contractors that subscribe to these documents.***

***Recommendation: The Engineering Division should provide training to consulting engineers and developers regarding its engineering permit submittal requirements.***

***Recommendation: The Engineering Division should provide feedback and assistance after each submittal when consulting engineers are involved in the development of the application and when they encountered particular problems meeting submittal requirements.***

**(3) Development Review Efficiency – Cost Recovery.**

Based on Development Review fees charged as reflected in the City of Grants Pass Comprehensive Fee Schedule documentation, in conjunction with the performance noted for an average plan check project of 2.5 to 4 hours, the present fee structure is satisfactory to recoup near-full or full costs associated with development review plan checking.

***Recommendation: Given existing Engineering development review performance, maintain the present Development Review fixed fee charges for plan check activities.***

# 6. ENGINEERING ADMINISTRATIVE AND ORGANIZATIONAL REVIEW

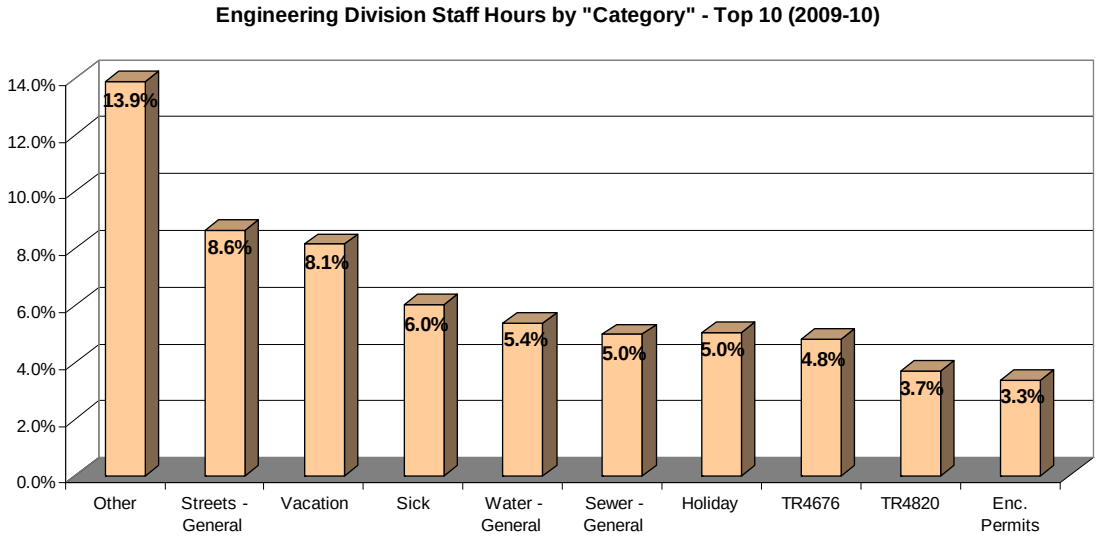
This chapter presents an analysis of the administrative and organizational elements surrounding the Engineering Division's operations, to include findings, conclusions and recommendations relative to a variety of administration, technology, and other internal organizational issues.

## 1. ORGANIZATIONAL FINDINGS, CONCLUSIONS AND RECOMMENDATIONS.

The following sections represent varied findings, conclusions and recommendations with respect to Engineering Division staffing and organizational issues.

### (1) The Overall Allocation of Engineering Division Staffing Hours Indicates Potential Time Allocation Issues.

Similar to project hours by task time discussed in the previous chapter, examining the allocation of Engineering Division hours by project category reveals potential issues likely related to present recording practices, existing human resources policies, etc. The following bar chart reveals time recorded by Engineering Division staff for a two year period by type of time (e.g. vacation or a specific project). The bar chart indicates those "top ten" hourly charge accounts.




The following is noted regarding the time allocations in the above chart.

- The "Top Ten" time categories represent approximately 64% of all time recorded over a two year period.

- The "Other" time category represents nearly 14% of all Engineering Division staff hours; such a time category provides limited information as to what is occurring and should not be used with such frequency.

- Leave time—Vacation, Sick and Holiday—represents 19.2% of all staff time as shown by the sum of the three bars above. This equates to approximately 400 hours per year based on all recorded time[19] or 10 weeks per annum of scheduled and unscheduled leave. While such leave may be consistent with the City's human resources policies and procedures, compared to many agencies such leave is rather excessive whereby the "norm" is typically seven weeks. Such leave time is likely not exclusive to the Engineering Division although such analysis is beyond the scope of this report.

- Three General time categories—Water, Sewer, and Streets—represents 19% of Engineering Division "project workload" over the last two calendar years. This essentially is approximately 1.5 full-time equivalents in the Engineering Division dedicated to these "general utility services."

- Time dedicated to Encroachment Permits appears reasonable.

[19] In 2009 and 2010 6,009 hours were recorded in vacation, sick and holiday for 7.5 staff or an average of 801.2 per staff for two years or approximately 400 hours per staff per year. This does not include 206.5 hours of Administrative Leave taken in the two-year period.

- Time dedicated to the two listed projects reflects 8.5% of Engineering Division time for generally completed street infrastructure improvements of $1.3 and $2.0M. Similar to the proportion of time spent on active projects noted in the last chapter, total proportional time spent on these two projects by Engineering staff is not unreasonable.

In summary, there appear opportunities for improvement related to the methods by which time is charged by Engineering. Both the "Other" and "General Utility" time categories appear somewhat excessively used and recording practices related to this should be revised. Additionally, although beyond the scope of this engagement, leave hours recorded appears excessive compared to many other public sector organizations—ten weeks leave is rather dramatic but may not be modifiable given bargaining unit or other employee agreements.

**Recommendation: Revisit methods for recording employee time by "project category" in the Engineering Division, monitoring both leave usage, and use of "General Utility" and "Other" time category utilization.**

**(2) The Organization of the Engineering Division is Somewhat Atypical.**

When evaluating any organizational structure, the purpose is to address important questions regarding lines of authority, responsibility and accountability. Well-managed organizations are designed to deliver services to customers and to maximize management control over service delivery. Organizational structure should be founded on the following principles:

- **A Department should be organized on a form follows function basis with a clear, distinct and comprehensive sense of purpose or mission for each division.** Functions are grouped consistent with their periodic interaction, management systems, delivery of services, and are linked in some way, resulting in functional cohesion.

- **The organizational structure should foster accountability.** The organizational structure fosters accountability among management, supervisory and line staff.

- **The plan of organization should enhance communication and coordination**.

The number of handoffs/exchanges required among different divisions providing service to the public is minimized. The structure enhances shared knowledge and understanding among divisions with similar mission goals and objectives. The channels of communication are clear and consistent.

- **Staff resources should be utilized efficiently.** The plan of organization minimizes administrative overhead. Workload can be distributed/shared to maximize the productivity of staff through peaks and valleys and offer cross-utilization capabilities. Processes can be fully standardized to enhance the efficiency and customer responsiveness of services (e.g., the provision of estimating, design, and inspection services).

- **The potential of human capital should be maximized.** The plan of organization enhances career development opportunities, training, recruitment and retention.

- **The services provided to customers should be responsive.** The plan of organization enables staff to provide better and transparent service to the public. Customers are the hub – with the Department designed around them**.**

- **Each operating division/section should be placed at a level in accordance with its importance in achieving departmental goals.** Divisions have not been placed too high in the departmental structure or too low relative to their importance.

- **The span of control for any manager or supervisor should not exceed the number which can be feasibly and effectively supervised.** The trend is to widen span of control.

- **Job classifications reflect the appropriate duties and responsibilities performed**. While consolidation of job classifications (broad-banding) has received increased attention over recent years, job classifications should reflect generally unique duties and responsibilities performed.

- **The organization facilitates job retention and promotion opportunities**. An ideal organizational structure should provide sufficient maneuverability to facilitate job growth, whether providing upward or lateral mobility to encourage staff promotion or retention.

- **The number of layers of management should not result in a tall, narrow configuration for the organization.** Organizations with many layers of supervision are associated with vertical decision-making that is becoming less common due to the need to rapidly effectuate change. Flatter organizations facilitate decentralized decision-making, as more authority for making decisions is given to the front line employees.

Any reorganization efforts that ignore these principles could create new, unintended and unfortunate consequences for the future. There are presently no issues with respect to span of control, supervisor-to-staff ratios, etc. within the Engineering Division. Given the small size, the organizational structure does not necessarily facilitate personnel retention and promotion opportunities however this is largely unavoidable in any small organization. With respect to Grants Pass, job turnover is somewhat negligible particularly in this economy. There are, however, two organizational issues of relevance deserving discussion.

**(2.1) There are Limited Engineer-centric Professional Job Classifications in the Engineering Division.**

Currently there is only one professionally educated/trained staff member in civil engineering principles in the Engineering Division—the City Engineer. The City Engineer is the only State of Oregon certified P.E. within the City[20], all subordinate staff do not have formal engineering training and most are classified as engineering supervision or technical support (specialist) positions. This is not an indictment on the capabilities of existing staff; rather, it is a finding that, when compared to many other peer public sector agencies of similar size there is minimal Engineer positions in Grants Pass. Indeed, in the 2003 Community Development Task Force Report[21] adopted by the Council in December 2003, an organizational structure was proffered showing two Engineering positions, five technicians, and one City Surveyor.

The absence of professional engineering positions limits the complexity of the projects that can be undertaken by the Engineering Division. While existing staff are

[20] The Public Works Director is a certified engineer in the States of Colorado and Wyoming, not Oregon.
[21] Council memorandum 093.

capable of performing various design, project management and inspection services, they cannot reasonably complete sophisticated projects without direct support of the City Engineer. While the City Engineer can periodically accommodate such activities, this restricts the ability of the City Engineer to perform other core business associated with Division management and supervision. As such, while existing workload and the economic environment preclude hiring another engineer position, in the long-term such consideration would be warranted to expand the professional capabilities of the division.

***Recommendation: In the long-term hire another entry-level professional engineer position to augment skill sets within the Engineering Division.***

**(2.2) Engineering Services Located in a Community Development Department is Uncommon.**

As noted above, the organizational location of a particular core service is important to facilitate both internal and external customer communication and satisfaction. Locating the Engineering Division within the Community Development Department is not a common public sector organizational strategy. There is typically greater alignment between a Public Works or Public Utilities Department where engineering services are generally found. In fact, a revisit of the Best Management Practices and Profile chapters demonstrates that the Public Works "client" is performing a number of Engineering "core functions" such as project estimating, project punch list development, inspection support, etc. Clearly in Grants Pass there is, by necessity of its size, culture and existing staffing allocation some blurring, of Engineering and Public Works responsibilities. As such, it is particularly curious that the Engineering Division is not within the Public Works Department. This, of course, has some long-standing precedence has historically Engineering has resided in Community Development when

there was no formal Public Works entity. The Matrix Consulting Group's experience nationally supports this kind of organizational alignment. As illustration only, a recent survey revealed the following results with respect to communities that utilize Engineering Services in a common/centralized engineering and design approach:

**Comparative Survey of "Centralized" Engineering Services**

| Community | Dept. Responsible for Engineering/Design | Comments |
|---|---|---|
| St. Louis, MO | Public Utilities | Centralized across all utilities. |
| Columbus, OH | Public Utilities | Centralized across all utilities. |
| Baltimore, MD | Public Works | PW responsible for all Water and Wastewater. |
| Houston, TX | Public Works | PW responsible for Water and Wastewater. |
| San Jose, CA | Public Works | PW responsible for Wastewater. Water is not a separate Department. |
| Atlanta, GA | Watershed Management | Consolidated department including Water, Wastewater, and Sewer. Utilize a centralized approach within the Dept. |

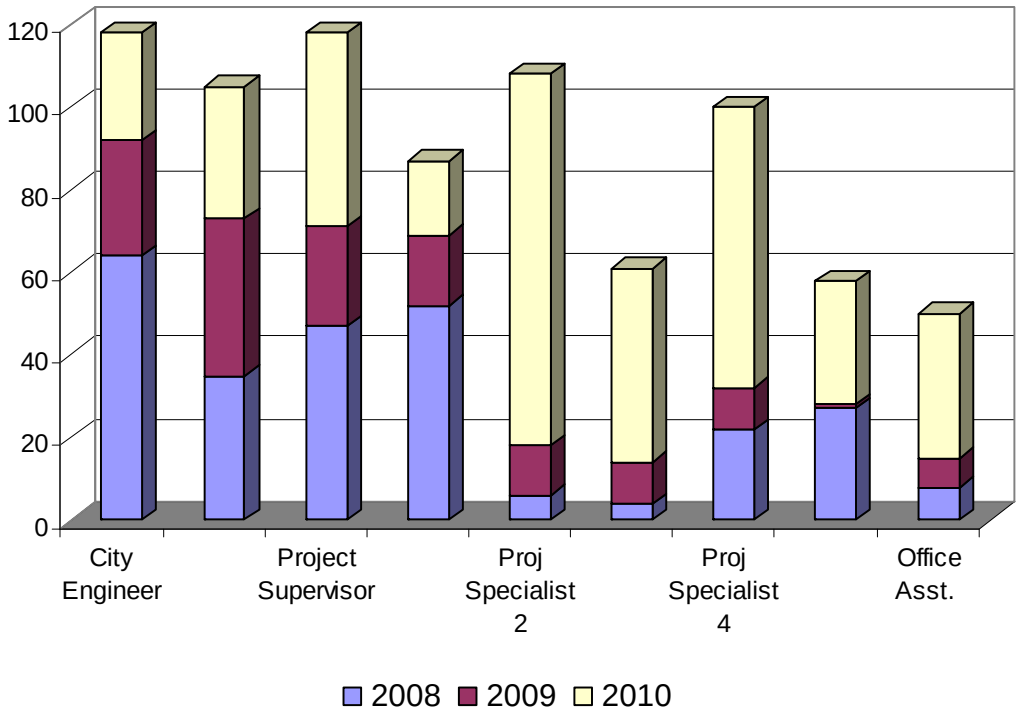
While these communities are certainly much larger than Grants Pass they do indicate that centralized engineering is performed in Public Works or Utility-based departments. This links the service provider (Engineering) to its core customers (Public Works and Utilities). While "relocating" organizational boxes is not often of the highest priority, such city-wide re-organization should be considered in the future. Addressing such discreet details necessary to ensure smooth transition from one department to another is beyond the scope of this audit report. Nevertheless, the issue is of sufficient significance that it is important to recommend a "blue ribbon" approach to help facilitate an effective engineering transition outcome.

***Recommendation: Seat an ad-hoc committee of Public Works and Community Development staff to help facilitate an effective transition that will help determine the specific steps necessary to fully re-engineer how such an engineering services transition from the Community Development Department to the Public Works Department should be accomplished.***

### (3) Overall Staff Training is Lacking Given Both Standard and Best Practices Requirements.

To ensure that staff responsible for delivering capital projects are competent in performing their current and future project assignments the Engineering Division should establish competency criteria for all key project management functions and activities, e.g., years of experience, professional certifications, education, and demonstrable capabilities in performing technical, engineering, and project management work from entry to advanced level. The Engineering Division should monitor training requirements for its staff, develops budgets and schedules to allow sufficient training, and maintain records of training and other professional development. These training activities should be actively coordinated with Human Resources so that their training activities are complementary. Currently, formal competencies have not been developed for staff members. These are typically memorialized in annual performance evaluations. Yet, annual performance evaluations are not consistently provided to Engineering Division staff. A review of three years of records indicated that four of seven performance reviews (57%) for Engineering Division staff in 2010 were not performed by February 2011; two of seven were not conducted in 2009; and one of seven was not performed in 2008. Indeed, one employee did not have a performance review in over a decade. While records indicate staff receive various training, no Engineering staff member has received a best management practice standard of a minimum of 40-hours annually (average) over the last three years. This is demonstrated in the chart below.

**Engineering Division Training by Position - 2008-10**




As shown by the bar chart, only two positions approached the average of 40 hours training per year—the City Engineer and Project Supervisor. And, these training hours are defined with the broadest interpretations as it relates to professional augmentation. Training was counted for such classes a CPR, Ethics Training, and Career Days at the High School. In fact, over the last three years very little professional development training has been provided to Engineering Division staff that would expand their knowledge base related to engineering services (i.e. Cost Engineering as discussed in the prior chapter). In effect, given the annual performance evaluation shortcomings combined with training limitations, formalized personnel skill set development has been very marginal for Engineering Division staff.

***Recommendation: Provide 40 hours of training to Engineering Division staff on an annual basis. Ensure at minimum 75% of this training is dedicated to skill set development associated with engineering-related practices.***

***Recommendation: Complete annual performance evaluations on all Engineering Division staff positions each calendar year. Incorporate into the evaluations desired key competencies and recommended training regimens.***

**(4) Use of In-house Versus Outsourced Contract Engineering Staff.**

Outsourcing, in general, can be defined as the passing of service provision or production to another internal or external party. Within the public sector it is defined as privatizing service delivery. One of the chief reasons for outsourcing is to reduce capital expenditure over a particular business process. As a result, management gets more time to concentrate on other core competencies as certain business practices are now performed externally. Outsourcing also reduces the dependency upon internal resources and increases the flexibility to meet changing business and commercial conditions. Finally, outsourcing is regularly used to address production or performance problems associated with specific in-house services. Even though several other reasons can be listed in favor of outsourcing, one must not overlook noted disadvantages.

By outsourcing a business process an organization tends to lose managerial control. This occurs because it is harder to manage the outsourcing service provider as compared to managing one's own employees. Also, there are often numerous potential hidden costs of outsourcing which includes legal costs of putting together a contract between companies, time spent on coordinating the contracts, resolution of problems with the vendor, etc. While the primary advantage stated for outsourcing is to reduce the overall expenditure of a business process, these hidden costs of outsourcing

are hard to predict causing overall costs to often be underestimated. Outsourcing may also result in the possible loss of flexibility in reacting to changing business conditions, and a lack of internal customer focus. Loss of internally generated talent is yet another problem associated with the outsourcing as it may hamper the growth of employees by depriving them from the experience gained by handling the business issues presented as opposed to passing it over to some other external party.

A recent study performed in New York indicated the following with respect to engineering services outsourcing.

> *An independent report released in January 2011 by the Polytechnic Institute of New York University finds that using private sector engineers versus public employees to design public works projects is at least 15 percent more cost efficient for New York State. The new study, led by F.H. (Bud) Griffis, Professor in the Department of Civil Engineering, Polytechnic Institute of NYU, validates an October 2008 study that found a 14 percent savings when using private sector engineers. Researchers maintain that the cost differential is understated due to the omission of certain public employee in-house costs.*
>
> *"At a time when the state's budgetary issues are of grave concern, this study proves that using private sector engineering firms will result in substantial savings," says Jay Simson, President of the American Council of Engineering Companies of New York (ACEC New York). "New York's consulting engineers are highly trained, world class innovators. In addition to specialized expertise and flexibility in staffing and scheduling, they bring a business perspective and competitive spirit to public works projects."*
>
> *The 2011 report "NYSDOT Engineering Costs: In-House vs. Outsourced Engineering" compares New York State Department of Transportation (NYSDOT) employee costs to private sector engineers' costs including: direct salaries adjusted for weekly work hours, medical insurance, pension plans, workers' compensation, unemployment, social security insurance and overhead.*
>
> *According to the study, the New York taxpayer pays between $207,112 and $232,251 annually for a typical NYSDOT engineer, while a private sector New York engineer costs approximately $186,142. The higher cost of the public sector employee is attributed to the expense of the benefits*

> *package, amount of paid time off, and less work hours per week compared to the private sector. The study revealed the total cost to taxpayers for a 30-year career NYSDOT employee is more than $6.4 million.*[22]

Based on various conflicting information from different sources, there is obviously no one right answer with respect to outsourcing services—it is a decision unique to each operating environment. With respect to Grants Pass Engineering services, the MCG recommends that engineering outsourcing should be considered a viable alternative for more complex project initiatives, but not as a replacement for maintaining an in-house core engineering operation. The reasons for considering periodic outsourcing combined with an in-house operation include:

- There is currently an insufficient level of in-house professional engineering positions to perform multiple complex engineering projects of high dollar value.
- Use of outsourced engineering services should continue to be made on a project by project basis using the Design Authorization Project Plan process.
- There is no significant evidence suggesting in-house Engineering Division staff area inefficient with respect to their workload. Data as well as external stakeholder opinions suggest otherwise.
- An in-house contingent of staff can immediately respond to internal and external customer needs.
- There is not a significant base of contracted professional engineering services in the Grants Pass area that can substitute for in-house staff.

In summary, outsourced services should continue to be used in Grants Pass for engineering support but not to fully replace in-house operations.

[22] http://www.prnewswire.com/news-releases/polytechnic-institute-of-nyu-report-confirms-using-private-engineering-firms-for-public-projects-cuts-costs-to-new-york-state-117061953.html. http://acecny.org/PDF/PolyReport2011.pdf

***Recommendation: Continue to use outsourced engineering services to augment in-house Engineering operations. Fully outsourced engineering is not warranted.***

**(5) There is Insufficient Detail Available to Effectively Predict Engineering Staffing Needs; However, there are Tools Available to Help Determine Staff Resource Requirements by Project and Overall.**

As shown in the profile chapter, the City has authorized 7.5 positions within the City to perform design, project management, and construction management activities. These staff are augmented by Business Operations division staff. In determining necessary staffing levels for engineering services, an evaluation of work charged to projects could be accomplished to identify potential issues; however as noted elsewhere in this report, the classification of time by task type, by category, etc. precludes informed and in-depth staffing analysis. Once time is effectively captured by Division staff, staffing guidelines can be developed based upon data developed by the American Society of Civil Engineers (ASCE) in their publication entitled, *Consulting Engineering: A Guide for the Engagement of Engineering Services* as referenced earlier. This conclusion, however, does not address the current dilemma with respect to is the Engineering Division adequately staffed. The following observations are noted:

- In the 2003 Community Development Task Force Report previously referenced the organizational structure suggested two Engineering positions, five technicians, and one City Surveyor for a total of eight (8) staff. Available workload metrics within that report were higher than current workload metrics with only 0.5 additional staff positions. This may indicate opportunities for staff streamlining.

- Conversely, in the FY 11 budget document it is indicated that three Engineering positions are currently frozen. This indicates an established need for additional engineering support.

- Based on conclusions noted throughout this report, there is no evidence that current Engineering staff are inefficient. Effectiveness can be improved but this results in “better” service, not “cheaper” service.

- Given the limited number of professionally educated engineering positions in the Division, there is little flexibility to transfer workloads among existing staff. Staff reductions would result in service decline.

Because the project team does not have details relative to individual project costs nor construction costs associated with the CIP information, analytically based staffing estimates cannot be readily developed, only anecdotal information can be supplied. However, the tools noted herein can be used to provide staffing estimates in the future for the Engineering Division. This should be considered an objective within the next 12-18 months.

***Recommendation: Upon noted process improvements, use the American Society of Civil Engineers and Association of Professional Engineers and Geoscientists workload guidelines to develop engineering and inspection staffing estimates for various CIP projects and the Engineering Division overall. This should be accomplished within the next 12-18 months.***

***Recommendation: Maintain existing staffing levels in the Engineering Division in the short term.***

## 2. ADMINISTRATIVE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS.

The following sections represent varied findings, conclusions and recommendations with respect to Engineering Division administrative related issues.

### (1) Modifying Engineering Service Charge Practices to the Development Community should be Considered a Vital Few Priority.

The Matrix Consulting Group is strong proponents of billability targets to assure that the staff of the Engineering Division are efficiently utilized. The City Engineer should set formal “billability” targets for staff assigned to the design and construction management / inspection of capital projects. These targets would represent that proportion of their work time that these staff should charge to projects each month. These staff should be “billable” to projects for not less than 125 hours per month or

1,500 hours annually. The H.T.E project accounting system, or successor software, should be utilized to monitor the performance of these staff against these targets.

While we propose billability targets, these targets are performance expectations only—they should not reflect the hours actually billed to external development customers or internal clientele. Currently, the Engineering Division is funded based upon actual hours worked and charged to both internal and external customers. Engineering is funded through an Internal Service fund mechanism generating revenues necessary to cover operating expenses. Based on budget information, the anticipated resources may fall below the requirements in this fund within a little more than two years if it is not supported from other sources. A $30,000 retainer is being charged in order to maintain the Engineering fund operations. Given the issue of internal charging and billability has been a point of emphasis in this study, the following additional details are offered.

**(1.1) Internal Service Fund Operations.**

While there are many definitions of an internal services fund, the Matrix Consulting Group subscribes to two complimentary definitions. This is also consistent with the definition perpetuated by writers of the *Government Finance Review* publication[23].

> **Utah State Legislature**
> *Internal Service Funds are defined as funds used by the governing body to account for the financing of goods and services provided by one department or agency to other departments or agencies on a **cost-reimbursement basis** (emphasis added). They are set up to take advantage of economies of scale, to avoid duplication of effort, and to accurately identify costs of specific governmental services. An Internal*

[23] http://www.le.state.ut.us/lfa/reports/isf_08-20-02.pdf. http://www.fldoe.org/fefp/pdf/red6.pdf. http://www.allbusiness.com/government/582941-1.html

*Service Fund sets its rates to recover the full cost of providing a particular service. Agencies have ISF costs built into their operating budgets, and each ISF bills agencies for services rendered.*

**Florida Department of Education**
*Internal service funds are established to account for any activity that provides goods or services to other funds, departments, or agencies of the primary government and its component units, or to other governments, on a cost-reimbursement basis. An internal service fund should be used only when the reporting government* ***is the predominant participant*** *(emphasis added) in the activity.*

Quite simply, an internal service fund is set-up to operate as a private business, where services rendered are paid for by end users. Ideally, in a government setting, the income (revenue) is such that a break-even operation at the end of the year transpires whereby there is no profit (surplus) or loss (deficit) at the close of the year. Interestingly, any department that provides services to other internal city departments, whether it is a human resources department or finance could potentially be established as an ISF given the above definitions; however, other accounting mechanisms have been found to be far more practical for such services.

One of the inherent features of an ISF is the ability to question the cost-effectiveness of services provided. This however, can potentially be a misnomer. According to an article in *Government Finance Review*:

*While ISFs may seem simple in concept, certain aspects of their financial structure often are not obvious to many government professionals. One area where lack of understanding is common involves the process of allocating ISF costs through user charges and the effects of such cost allocations on the governmental organization's bottom line. This usually manifests itself in the belief that if one can find a private-sector vendor willing to offer the same service as that offered by the governmental ISF at what appears to be a lower price, money can always be saved. This may not be true, and utilizing such private vendors rather than the ISF can oftentimes substantially increase the governmental organization's costs for a given service. If an ISF function is to finish a fiscal year without*

> *a surplus or deficit, its charges to customer departments should equal those customers' appropriations for that ISF service. To the extent that ISF customers purchase the service from a different vendor, the ISF will not realize all its appropriated revenues and will, therefore, incur a deficit. While a customer department shopping elsewhere might feel it has saved money by bettering the ISF price, that customer department may have, in fact, increased the organization's costs overall.*[24]

The creation of an environment of "managed competition" creates its own set of problems that can ultimately be disadvantageous to the municipality in question. In summary, while an Internal Services Fund is certainly an appropriate accounting mechanism for a City Engineering operation (if the municipality so chooses), the Matrix Consulting Group believes there are better approaches.

**(1.2) Engineering Division Revenue Alternatives.**

The MCG is generally in favor of many internal service fund concepts, it is not appropriate for Engineering-related services as it over emphasizes cash collection and risks customer service. Internal Service Funds should operate whereby the government entities, as noted before, are the predominant participant. Grants Pass relies on private developer charges to augment their internal services fund. The actual "materials and supplies" charges have no predecessor estimating, ultimately resulting in an unknown charge to the customer for services rendered. This results in a multitude of problems tantamount to the Engineering Division potentially being perceived as having no limits on project-based charges that could be incurred. Additionally, under the current operating practice, Engineering staff tend to focus on billability targets and identifying projects with sufficient funds to charge hours as opposed to focusing on quality service delivery irrespective of project budgets. This perception of Engineering staff is linked directly to an Internal Services Fund model of "managed competition" and the focus on

[24] http://www.allbusiness.com/government/582941-1.html

providing services that are perceived as "billable." Unchargeable work, that is part of any business, is not perceived within Engineering as "value-added." Reiterating from the external customer survey chapter, "As fees are based on time and materials, the "quality" of the staff person you are working with, combined with the complexity of the project, can directly affect the cost paid (by the developer) to the City." No internal or external customer should have unknown fees with Engineering services rendered.

Just as there are several specific fees for service in the Grants Pass Comprehensive Fee Schedule, specific and fixed fees for service should be charged for all Engineering services, and the budgetary requirement to fund the Engineering Division through "time and materials" payments eliminated. Given a fixed fee structure for all services, hourly rates of Engineering Division staff become generally redundant, and are only useful in calculating and understanding the future loaded costs for fixed fees for service. There is an excellent fee for service model in the State of Louisiana's Community Development Block Grant Program that can be emulated. This includes the following terms/conditions:

> *Basic services will be contracted as a lump sum tied to project construction costs; however, the maximum allowable fees for the project will be calculated based on a percentage of the estimated construction cost. The fee percentages are as follows:*

| Estimated Construction Cost | Basic Service Fee |
|---|---|
| $0 - $30,000 | 14.6% |
| $40,000 | 14.1% |
| $50,000 | 13.6% |
| $60,000 | 13.2% |
| $70,000 | 12.9% |
| $80,000 | 12.6% |
| $90,000 | 12.3% |
| $100,000 | 12.0% |
| $200,000 | 11.0% |
| $300,000 | 10.3% |

| | |
|---|---|
| $400,000 | 9.8% |
| $500,000 | 9.3% |
| $600,000 | 8.8% |
| $700,000 | 8.6% |
| $800,000 | 8.4% |
| $900,000 | 8.2% |
| $1,000,000 | 8.0% |

*This fee will be the engineer's compensation for providing engineering services traditionally known as "basic services" found in standard engineering contracts from the preliminary design phase through the post-construction phase*

*The engineer shall also furnish an inspector, assistants, and other field staff to assist the engineer in observing the progress and quality of the work. The inspector shall be under the engineer's supervision and normally is to be a member of the engineer's staff or a contract employee. The engineer shall attest to the inspector's qualifications and abilities to perform the appropriate duties and responsibilities. The fee for the inspector is to compensate for the effort necessary to ensure that the construction project is properly and adequately inspected. As part of his duties, the inspector will prepare reports recording, at a minimum, the following information: project name, contractor's name, date, weather conditions, contractor's work force (indicating work classifications), equipment (in use or idled), quantities of pay items installed, deficiencies in materials or work, general observations, summary of construction activities, and inspector's signature. Each report shall be completely filled out. Inspector services will be contracted as a lump sum to project construction costs; however, the maximum allowable fees for the project will be calculated based on a percentage of the estimated construction cost. The fee percentages are as follows:*

**Inspector Services Table**

| Estimated Construction | Services Fee |
|---|---|
| $100,000 or less | 5.0% |
| $200,000 | 4.6% |
| $300,000 | 4.3% |
| $400,000 | 4.1% |
| $500,000 | 3.9% |
| $600,000 | 3.8% |
| $700,000 | 3.7% |
| $800,000 | 3.6% |
| $900,000 | 3.5% |
| $1,000,000 | 3.4% |

As it relates to the development of a fixed fee model, the following considerations, at minimum, need to be addressed.

- Is the engineering fixed fees intended to be full cost recovery or some portion thereof. A full cost recovery fee will include loaded costs for estimated engineering services to include other city overhead costs typically developed in cost allocation studies. Beyond addressing the full-cost recovery model, what percentage should be recovered, 100% or a portion of 100% thereby subsidizing Engineering services offered? This is a policy decision.

- Should the organization offer discounted fees for small businesses or individuals to facilitate economic development? This is a policy decision.

- Fixed fees are based on the estimated cost for providing the "average" engineering service. Best practice suggests that a fixed fee should reflect the maximum amount owed. Conversely, however, if actual costs to provide the service are less, should the engineering services recipient be refunded the difference? This is a policy decision.

In summary, all engineering services should be based on a fixed fee modeled after the previously noted CDBG program or some similar derivative.

With respect to internal accounting, MCG recommends developing a less sophisticated process that does not have the inherent "managed competition" and other perceived issues of an ISF. In sum, the Engineering Division budget would be developed and funded annually through a fixed appropriation of funds from various sources—whether utilities, road tax, general fund operations, fixed fees for service, etc. These appropriations may change year to year dependent upon the capital improvement program undertaken. By example, if a large underground utility project were planned in a fiscal year, the amount of this project related to engineering services would be appropriated to the Engineering Division. This does not preclude Engineering billing to this project and the associated revenue from utility funds (which is a best practice) to ensure effective, efficient and accountable operations of Engineering.

***Recommendation: Formal "Billability" targets should be established for staff of the Engineering Division to help monitor performance.***

***Recommendation: Specific and fixed fees for service should be charged for all Engineering services, and the budgetary requirement to fund the Engineering Division through "time and materials" payments eliminated. There are excellent fixed fee for service models that can be emulated including the State of Louisiana's CDBG Program.***

***Recommendation: Update Engineering (and other City fees) on a regular basis based upon the fully-loaded cost of conducting business. Loaded costs should be fundamental to a fee-based cost recovery model.***

***Recommendation: Eliminate the Internal Services Fund model for the Engineering Division and fund the Division through annual appropriations from relevant funding sources (e.g. utilities, general fund, road tax, etc.).***

**(2) Initiate Improved Software Solutions for the Engineering Division.**

The Engineering Division needs to implement more robust software tools to augment its processes. Currently the Division uses H.T.E.—a DOS successor that is primarily an accounting product used for both permitting and project-related activities. The City is looking at this product's upgrade called SunGuard. In addition, Microsoft Project is a project management software program which is designed to assist project managers in developing plans, assigning resources to tasks, tracking progress, managing budgets and analyzing workloads. The application creates critical path schedules, and critical chain and event chain methodology third-party add-ons are also available. Schedules can be resource leveled, and chains are visualized in a Gantt chart. Additionally, MS Project can recognize different classes of users that can have differing access levels to projects, views, and other data. As noted previously in this report, project management software tools would assist the Engineering Division in performing varied tasks. The City should purchase sufficient licenses for MS Project at approximately $600 per license.

**Recommendation: Purchase approximately six (6) licenses of Microsoft Project software for the Engineering Division at an estimated $600 per license. Continue exploring upgrade of the H.T.E. legacy software.**

### (3) S.M.A.R.T. Approach to Performance Management.

As a component of the City's annual budget, performance measures are developed for each organizational unit within the City of Grants Pass. The FY 2011 performance measures for the Engineering Division include:

- Capital projects will be completed within the authorized budget year for completion, unless the schedule is changed.
- Within 14 calendar days of the division's actual receipt of completed private development construction plans and pertinent information, the Engineering Division will have coordinated with other City divisions and outside agencies and completed their first review. This target is anticipated to occur 80% of the time. Engineering will provide subsequent reviews within a 7 calendar day period.
- Engineering will issue encroachment permits within 7 calendar days of the completed application. The target for this goal is to be met 90% of the time.

Although this effort was noteworthy, it was somewhat elementary in comparison to best-business practices. Several additional steps can be taken to improve the tracking of performance, linking goals to objectives and ultimately to outcomes, and overall enhancing "performance management."

The Engineering Division and City is not atypical compared to many government entities in regard to its sophistication in measuring performance, linking production to not only outputs but outcomes, etc. Similar to many jurisdictions, "performance reports" within the Engineering Division are not regularly generated, distributed, and reviewed; little is done with the performance measurement information. The most advanced performance measurement systems are generally found in the private sector. Yet the value of performance measurement cannot be underestimated, particular since performance measurement is a core business practice and fundamental to many successful companies. An often repeated phrase is, "You cannot manage what

you can't measure." The belief in this sentiment is the cornerstone of the performance measurement philosophy.

SMART is an acronym for (S)pecific, (M)easureable, (A)chievable, Ielevant, and (T)ime-bound. Specifically:

| | |
|---|---|
| Specific | Objectives must express the action and results required so that the reviewer of the objective can see clearly whether or not the objective has been achieved. |
| Measurable | When setting objectives, there must be some way of measuring and validating whether the objective has or has not been achieved and to what level of success or failure. |
| Achievable | Although objectives should be challenging and encourage continuous improvement, they must be reasonable and achievable. |
| Relevant | The objectives must be pertinent to the organization's core business practices and measure performance that reflects critical operations fundamental to the success of the work unit's mission. |
| Time bound | Objectives need to have clear time frames attached to them such that success or failure can be analyzed within an established period. |

Using this model as a framework, many City performance measures do not reflect effective performance measures that meet the SMART criteria. By example, the Engineering Division measure: "Capital projects will be completed within the authorized budget year for completion, unless the schedule is changed" has no significant relevance to performance—it is designed to achieve a time target, nothing more. While turnaround time and encroachment permit information has SMART elements, as noted elsewhere in this report it reflects a very minor amount of Engineering Division workload and is thus somewhat immaterial. Throughout the budget much of the information provided is a generic goal without linkage to the necessary steps (objectives) to accomplish that goal, or it is a performance *metric* or *indicator*. A metric is essentially a counting of an occurrence linked to some type of task a work unit performs. For example, the number of inspections made in a month or the number of surveys completed. An indicator, often called a Key Performance Indicator (KPI), is a somewhat

more sophisticated form of a metric that provides additional information that reflects the organization's goals, that is quantifiable (measurable), and that is a key to business success. It differs from a performance measure in that it only possesses three of the five SMART characteristics (Specific, Measurable, and Relevant). For example, the response time to a medical call for service in a certain area is a KPI. A performance measure is the *output* of a performance objective that leads to a desired *outcome*. There are several city performance measures that do not reflect SMART performance measurements. The purpose of performance measurement is *to impart key information to assist in managing and decision-making.* By example, the U.S. Department of Transportation provides some engineering-based performance measures located at http://www.fhwa.dot.gov/ve/performance.cfm . Interestingly, while some have SMART characteristics, other do not, demonstrating performance management is a difficult endeavor, indeed. Reiterating, Engineering Division performance measures should fundamentally assist in management decision-making. Thus, they can surround the following operational *topics* (these are not performance measurement statements, just areas for performance measurement exploration):

- The proportion of milestone steps achieved on-time in engineering projects during the fiscal year.
- The frequency in which projects are delivered on-time and on-budget.
- The staff achievement of established annual billability targets to specific workloads (not miscellaneous or other time categories).
- Not exceeding project staff time dedicated to project tasks based upon initial ASCE resource loading guidelines for each project.
- Other topics to assist management decision-making.

The following recommendations are made to improve performance management. Note that these suggestions cannot only be applied to the Engineering Division, but to all City departments and divisions.

**Recommendation: The Division should re-invent its performance measurement *system using the principal concepts noted in this section. There are numerous professional journals, articles, training sessions, and books on performance measurement.***

***Recommendation: The Division should be held accountable for fully implementing a performance measurement system in their organization and should be held accountable for regular reporting of results. This information should be shared, in report format, with the City Manager, and perhaps the Council, on a quarterly basis.***

***Recommendation: In the revision of the performance measurement system the Division should properly define and use outputs and outcomes with the intent to capture outcomes as often as possible.***

### (4) Engineering Should Develop a Capital Improvement Program Project Management Manual.

Given the longer term magnitude of the City's capital expenditures, it is important the City use effective project management procedures to assure that these projects are managed efficiently, are allocated the necessary resources to accomplish the projects' objectives, and that provide avoids risks to minimize the potential for cost or schedule overruns. To achieve this goal, the City should develop a comprehensive project management policies and procedures manual that addresses project management, cost management, schedule management, scope management, risk management, quality management, contract development, contract administration, project communication / reporting, and document management.

The capital project management policies and procedures manual should address the process to be utilized for managing projects and the technical aspects of project and

construction management. The process aspects that should be included in the policies and procedures manual are presented below.

- **Initiating and aligning the project team that will be utilized for project delivery**. This includes developing a clear understanding of the purpose and goals of the project, developing a project description, identifying the members of the team, the major milestones, the boundaries of the project (scope control), the team roles and responsibilities, the measures of success for the project, and operating guidelines. The deliverable would be a project initiation and alignment worksheet.

- **Planning the work of the project.** This would involve the development of the project plan. The project plan should include a work breakdown structure based upon a master deliverable list developed for the City's project delivery (i.e., project definition, consultant request for proposals, project finance plan, construction cost estimate, project management plan, design development, value engineering, etc.), development of a risk management plan (deciding how to approach, plan, and execute risk management activities), developing a communication plan, developing a change management plan (for scope control), developing a quality plan, and developing a transition and control plan. The project plan should be scalable based upon the size of the project.

- **Endorsing the plan**. This involves gaining the commitment to the project management plan by the project team, City management, and the City Council.

- **Working the plan**. This involves actively managing the execution of the project in terms of design, construction management, and construction inspection. It includes managing the scope, the schedule, and the budget, the risks associated with the project, change, and communicating progress with the project.

- **Transition and closure**. This involves acceptance of the work, demobilization, financial closure, development of a written "lessons learned," and development of "as builts" and archiving.

While it is important for the policies and procedures manual to describe the process of managing a capital project, the manual also needs to address the technical aspects of managing a project. This should include such aspects as noted below.

- Design consultant selection.

- Design consultant contract administration;

- Design coordination and review;

- Developing construction cost estimates;
- Advertising and award of construction projects;
- Constructability review of designs by Construction Management;
- Initial guidance to the construction contractor (i.e., pre-construction meeting, submittals, pay requests, etc);
- Public relations during construction;
- The Engineering Inspectors daily report;
- Construction quality control;
- Materials testing;
- Project files;
- Project acceptance; and
- Project warranty procedures.

Engineering Services should develop a capital improvement program project management manual to assure these projects are managed efficiently, allocate the necessary resources to accomplish the projects' objectives, and minimize the potential for cost or schedule overruns.

***Recommendation: The Engineering Division should develop a capital improvement project procedures manual.***

***Recommendation: The Engineering Division should develop an on-line capital improvement project management guide.***