FLORIDA DEPARTMENT OF TRANSPORTATION
TURNPIKE ENTERPRISE

OFFICE OF PRODUCTION

QUALITY ASSURANCE & BUSINESS PRACTICES PLAN

August 2011

1.0 PURPOSE

Quality is the result of accomplishing many individual but interrelated tasks in conformance with criteria, no matter how large or small their contribution to the overall objective, in pursuit of a product or service of superior properties or performance. Florida's Statutes 334.045 (1) (b) requires a Quality Control Process. Each FDOT District shall be responsible and accountable for quality and compliance with all laws, rules, policies and procedures related to the operation of the Department. Since all Turnpike project design and plans production is contracted to Consultants, the Turnpike Enterprise provides compliance reviews, not quality control. The requirements of quality control are delegated to the Consultant. Consultants are responsible for supplying the Department with high quality work that is correct, accurate and complete. The underlying premise is that quality adds value, whereas lack of quality increases costs and, consequently reduces value.

The Turnpike Quality Assurance and Business Practices Plan is not intended to supersede the FDOT Plans Preparation Manual (PPM) or the Turnpike Plans Preparation and Practices Handbook (TPPPH). Instead the plan confirms conformance to the criteria set forth within those documents and develops an overall process and atmosphere that instills the importance of quality. The plan relates specifically to the Turnpike Office Production and its interrelations to other functional areas before, during and after the preparation of construction documents. The plan will be reviewed and updated to include the latest "best practices" on a periodic basis.

2.0 OBJECTIVES

The main objective of the Quality Assurance and Business Practices Plan is to ensure quality measures are in place and functioning in a business-like manner in order to maximize value. Value can be quantified as:

- safeguards to our patrons and the public
- reduced rework and production costs
- meeting or exceeding project milestones
- minimizing construction supplements

Increasing value will enhance the overall quality of the Turnpike patron's experience and the investments made by bondholders.

3.0 METHODOLOGY AND MEASURES

Quality Assurance is a management function to make certain that all required quality control measures are accomplished. To achieve the goals set forth in this plan a series of practices must be in place that encourage and ensure quality control throughout the production process and life of the project. The Quality Assurance and Business Practices Plan describes the management responsibilities and procedures as they relate to major production operations and functions. This "concept to concrete" approach is achieved through focusing on quality control before, during and after issues arise. As outlined in the Sterling Criteria for Organizational Performance Excellence established by the Florida Sterling Council,

"Information and analysis are critical to the effective management of your organization and to a fact-based system for improving performance and competitiveness. Information and analysis serve as a foundation for the performance management system."

The methodology encourages the use of open communication to generate a factual system that can be reasonably analyzed. Therefore, to measure performance, processes and goals must be quantifiable. The results of the performance measures can then illustrate the effectiveness of the processes in place and identify areas requiring performance and/or process improvement.

The methodology must also be practical to implement and be able to achieve accountability without adding excessive cost or time to the process.

Each section contained herein states the objective of that functional area, and sets quantifiable measures that can be analyzed and compared to set goals.

4.0 MANAGEMENT POLICIES AND PROCEDURES

This section covers Quality Assurance procedures that are enacted on a Program Management, Project Management and Design Discipline level throughout the life of the project. Often these items take the form of meetings to promote information sharing and overall project understanding. Management policies and procedures are often general and not necessarily project specific.

Quality Assurance is the Project Manager's (PM) responsibility. As the Chief Executive Officer (CEO) of the project, it is their duty to drive all aspects of the project to a successful, coordinated completion. Likewise, the PM is ultimately accountable for the success or failure of the project. As quality breeds success, it is imperative that the PM monitor quality performance and processes to ensure project success.

Objectives:

Instill the importance of project quality in an open atmosphere that encourages a team approach in order to deliver projects on time, within budget and fulfilling the scope of the project with construction documents that are accurate and constructible.

Measures:

1. *Agenda Package* – The Agenda Package is Turnpike's "report card." As such, if an Agenda Package project is not initiated or let on schedule, it is noted in management's score. This effective measure will also be used to measure Production's ability to produce projects on time.

2. *Letting Commitments* – For those projects that are not on the Agenda Package, the letting date commitment, as set forth in the project schedule, will be tracked as a measure of on-time project delivery.

3. *Production Date* – The Production date in the project schedule is when all plans and documents are completed and the project is ready to advertise for construction. This date includes successful electronic submittal of signed/sealed plans and specifications. Again, this date is tracked as a measure of successful project delivery.

Quality Assurance Procedures:

1. *Quality Control (QC) Criteria Consultant Workshops* - The focus is on instilling top-down quality control to consultants. The listed Principal in Charge or other key staff on all Turnpike design projects is invited to this workshop. Topics include the QC Certification, developing quality processes and procedures to correct current quality problems, and discussion of changes to enhance the quality control function. This may occur as part of the annual Turnpike Consultant Forum.

2. *Quality Assurance Audits* – The Turnpike Quality Manager will conduct one or more audits each year on all Consultants producing construction and planning documents for Turnpike projects. These pre-submittal audits confirm the consultant's proper use of completion checklists, fully marked check sets, and the QC log at a minimum. This process is further defined in the TPPPH.

3. *Project Communication* – Constant and consistent coordination is key to ensuring open communication and reducing errors due to misinformation. The PMs shall be tasked with spearheading project coordination throughout the project. This will not only be a job requirement but a philosophy.

4. *Public and Local Government Involvement* – In order to eliminate future contract cost and schedule changes resulting from changes in project scope, the Turnpike will continually disseminate new and revised information to project stakeholders. This may take the form of local government and Metropolitan Planning Organization (MPO) presentations, presentations to citizen groups and homeowners' organizations as well as the existing mediums of Project Development and Environmental (PD&E) and design public meetings, workshops, hearings and newsletters. All public and local government efforts are coordinated through the Regional Planning Administrator assigned to that geographic area and through the Public Information Office.

5. *District Senator/Representative Updates* – In order to keep state elected officials updated on project status, the PMs in conjunction with Turnpike Environmental Management Office (EMO) routinely send project updates after major project milestones or design changes and prior to public meetings. The protocol for information delivery will be set at the project's beginning. This helps reduce confusion and maintain consistency when elected officials discuss major projects in their districts with their constituents.

6. *Elected Official Commitments* – Agreements and commitments are often made with local, county and state officials that need to be carried from PD&E to design and from design to construction. To facilitate this flow of information a commitments module has been established in ProjectSuite Enterprise Edition as a central database that all departments can access and use. See Section 10.0 Construction for more information.

7. *PMs Must Approve/Recommend Cost and Schedule Changes* – As the CEO of the project, the PM has the most comprehensive understanding of issues. Requiring PM approval for all project cost and schedule changes ensures that the dynamic progress of the project is cohesive and consistent within the original scope and commitments.

8. *Agenda's, Minutes, Action Items* – All project meetings will require an agenda, meeting minutes and a summary of action items prepared by the Consultant. This will help ensure focus, communication and accountability.

9. *Permit Agency Meetings* – The EMO Permits Coordinator meets with permitting agencies on an as-needed basis, which can be as frequently as every month, to discuss current issues, develop solutions and clarify requirements. This information is shared with the PMs and Consultants.

10. *"Ignite the Torch" Meeting* – As the Design Scope of Services is being finalized, a meeting is held between PD&E/Concepts staff and the PM to brief the PM on the evolution of the project, the stakeholders in the project, and any specific concerns to be addressed during design.

11. *Scope of Services Meeting* – Prior to staff-hour negotiations, a meeting is held with the Consultant and Turnpike design staff. The project scope is overviewed with key issues emphasized. This ensures a common understanding and eliminates confusion prior to preparing staff hour estimates and negotiating the design contract.

12. *Scope of Services* – As part of the standard design scope of services, quality control is always included within each functional area. Subsequently, this line item effort is reflected in the staff hour negotiations', ensuring the Consultant is compensated for quality control requirements.

13. *Internal Kick-Off Meetings* – Prior to the project kick-off meeting, the project manager holds an internal kick-off meeting with the design review staff where he/she summarizes the project. This meeting solidifies a common understanding of the project scope and resolves issues prior to engaging the Consultant. The result is a decrease in "mixed signals" and Consultant confusion.

14. *Pre-Negotiation Field Review* – For large and complex projects, a field review is scheduled prior to negotiations. This further ensures a common conception of project needs and requirements and helps reduce confusion, rework and supplemental agreements.

15. *Progress Meeting* – Regular progress meetings between the PM and Design Project Manager are held either monthly or bi-weekly depending on project complexity. Members of the Turnpike design staff are invited on an as-needed basis. This provides a communication forum and ensures the project is progressing efficiently and according to scope. Furthermore, design issues can be resolved prior to submittals, reducing rework.

16. *Monthly Status Reports* – Once a month, the Design Project Manager provides the PM with a written status report for each project. Information documented includes activities during the previous month, upcoming activities, major project milestones, a list of meetings and budget

status. The submission coincides with the monthly Production Meeting and provides another means by which project progress and efficiency can be monitored.

17. *Production Meeting* – The entire Production staff meets on a monthly basis and reviews the status of all design projects and other minor production efforts and areas of interest. This provides Turnpike Program Management and PMs the opportunity to understand all of the current work efforts. Interdependencies and ideas can be brought to light and shared.

18. *Turnpike Management Schedules* – Each project has a Turnpike Management Schedule prepared by the PM with input from all major disciplines. These schedules include major project categories such as right-of-way, permitting and utilities. The PM is tasked with ultimate responsibility for the schedules; however, each major component is updated monthly by assigned personnel in each discipline. This provides the PM with the most current information, ensuring that all affected areas are aware of the project status and allows for corrective action to be taken in order to meet the project Production Date.

19. *Reviewer QA Plan* – The Turnpike design staff implements a Quality Assurance review as they perform their compliance review. The focus is on ensuring compliance with standards, general completeness and avoiding major project "busts." The focus is not on individual checking of numbers and calculations or plans correctness. This is the contractual responsibility of the Consultant.

20. *QC Non-Compliance Resolution* – As soon as it becomes apparent that quality has become an issue and citing examples, the PM may elect to confer with the Consultant Project Manager and/or Principal in Charge to inform them of the concerns regarding quality and the importance the Turnpike exerts on delivering a quality product. In circumstances where errors have been repetitive and severe, and the Consultant has not responded to the efforts of the PM, the Turnpike Design Engineer may choose to contact the Consultant Principal in Charge. Although this action should be used sparingly, it gives the Consultant a chance to improve quality prior to actual problems or consultant grades being released.

21. *Project Management & Design Review Meeting* – The Project Management Program Manager and the Plans Review Program Manager meet weekly to discuss issues that have arisen with respect to plans production and design involvement and determine what, if any, corrective measures need to be implemented.

22. *Discipline Specific Meetings* – At the PM's request, meetings are held with specific design disciplines on an as-needed basis to resolve issues and/or determine approaches to problems. Staff hours are included during contract negotiations for such meetings.

23. *Interim Consultant Grades* – The Consultant is subject to grading at all major submittals (less often for smaller projects). This provides quantifiable and documented feedback to the Consultant as to their performance and quality. Establishing interim grades allows for corrective actions to be taken prior to final construction documents.

24. *Supplemental Review* - All work order changes, time extension justifications and construction supplemental agreements will be analyzed to determine causes. These causes will be

summarized in a quality issues list that will be reviewed and solutions to recurring problems implemented.

25. *Completed Staff Work* – The doctrine of Completed Staff Work defines the philosophy by which completed work is presented. The doctrine calls for complete and comprehensive work that is succinct and to the point, requiring only approval or disapproval. This philosophy has been adopted by Turnpike Production and is often shared with Consultants in order to educate them of our expectations.

5.0 CONCEPTS AND PD&E

This section relates to the process of project development and conceptual analysis and their relation to design. Of specific emphasis is the manner by which the original scope is carried into and through the design process and the effort by which issues are not revisited that were sufficiently addressed. Since, except in a few cases, there is either no Consultant or a different Consultant involved in the conceptual and PD&E stages versus the design stage, a majority of the quality assurance responsibilities lies with the Concepts, PD&E and Design Project Managers.

Objective:

Ensure the project design concept successfully fulfills the original need, the original intent and purpose of the project is conveyed into the design and construction phases and the project commitments are met.

Measures:

1. *Construction Cost* – The preliminary construction estimate produced as part of either the PD&E or Concept Report will be reviewed by the design consultant at the onset of the design contract for general concurrence. This cost will be compared against the final Engineer's Estimate as a measure of the relative change to the overall project scope.

2. *Right-of-Way Area* – Another measure of scope adherence will be to compare the final area of acquired Right-of-Way to the proposed area as set forth in the PD&E study.

3. *Mitigation Cost* – As above, the final environmental mitigation costs will be compared to the costs estimated in the PD&E study to help pinpoint major project changes.

Quality Assurance Procedures:

1. *Concept and PD&E Kick-off Meetings* – The Concept Kick-off meeting is held prior to any work to discuss the project plan and quality control requirements. All interested entities and disciplines participate, including the assigned Project Manager. The meeting is held to:

    - Examine preliminary alternatives and potential project constraints
    - Identify public and local government involvement

- Facilitate information sharing and due care regarding production during the initial concept and scope development.

The PD&E kick-off meeting is held before any work begins to assure that the consultant completely understands the scope for the project and the QA/QC responsibilities. All disciplines from the Turnpike that will have input in the project including the proposed Design PM for the project take part in the meeting.

2. *Concept and PD&E Field Reviews* – On-site field reviews are mandatory and critical in assuring quality concept and PD&E reports that avoid gaps in the project scope. Discipline representatives from Planning, Production, Construction, Maintenance, Tolls, Facilities, Structures and Roadway, as well as, other key personnel should be in attendance.

3. *ConTAC* – ConTAC stands for Concepts Technical Advisory Committee. The ConTAC is initiated to provide technical input by all appropriate departments, disciplines and stakeholders during the development of a Concept Report. An initial meeting will be held to present concepts in the early stage and identify major development considerations, including constructability. Meetings will be scheduled on a regular basis to brainstorm, develop preliminary alternatives and consensus building. The primary members will be responsible for designating a delegate if they cannot attend and for assigning disciplines within their respective office as needed for future meetings.

4. *Concepts PDSR/30% Design Submittal Review* – The Concepts Project Manager reviews the draft Project Development Summary Report (PDSR) or 30% Design submittal for conformance to the original intent and scope and to ensure that issues that have already been investigated are not revisited.

5. *Total Cost Estimate* – The Cost Estimate at the Concept stage and, if applicable, at the PD&E level of project development consists of an LRE (Long Range Estimate) and other factors that could control or contribute cost to the project such as right-of-way requirements, mitigation, major reimbursable utility relocations, etc. These costs are itemized and reviewed by all affected parties.

6. *PM PD&E Involvement* – The future PD&E PM and Design PM, if known, may be involved during the concepts phase. In order to ensure a healthy understanding of project issues and history, the Turnpike Design PM is invited to participate in PD&E activities such as progress meetings, value engineering studies, public meetings and field reviews. Once the project is in Design the PD&E and Concepts Project Managers will have input during the Design process. This helps maintain a consistent project message and understanding.

7. *Project Commitments* – If there are any commitments made to stakeholders during the Planning, Conceptual Engineering or PD&E phases, they are included in the State Environmental Impact Report or Project Development Summary Report (SEIR/PDSR) and passed on to Design. The Design PM assures that these commitments are carried through the design phase and that any construction related commitments are passed on to construction. Other project commitments that are not recorded in the SEIR/PDSR are tracked through the ProjectSuite Enterprise Edition application on the Turnpike website.

8. *Changed Conditions* – The Concepts Project Manager is responsible for reviewing major concept changes during the PD&E study. It is the PD&E PM's duty to coordinate these changes with the Concepts Project Manager. The PD&E Project Manager is responsible for reviewing major design changes to the original PD&E study to ensure none of the previous impacts have changed and no project commitments have been neglected. It is the Turnpike Design PM's duty to coordinate these changes with the PD&E Project Manager, as well as to work with the Construction PM if any changes take place during the Construction phase.

9. *PD&E Lead on Traffic Noise* – Traffic noise issues are often very controversial and involve dealing with the public. The PD&E staff takes the lead role on project related traffic noise issues. PD&E personnel carry this responsibility through the project life, providing a consistent message.

10. *Construction Involvement in PD&E* – See Section 10.0 Construction.

6.0 PLANS PREPARATION & DESIGN

During the plans preparation and design phase, the actual construction documents are produced. The majority of the measures below are centered on guiding and correcting the efforts of the Design Consultant. A substantial portion of the measures may require rework or additional effort on the part of the Consultant but are aimed at eliminating costly errors prior to construction. Several processes specifically outlined in the TPPPH are included.

Objective:

Prepare plans that are consistent with the initial scope of services, correct, accurate and constructible with a minimum amount of Supplement Agreements.

Measures:

1. *Unforeseen Supplemental Agreements* – Although sometimes uncontrollable, Unforeseen Supplemental Agreements are often an indicator of gaps in the project scope. The quantity of these Supplemental Agreements on design projects will be tracked as an indicator of scope gaps or errors and as an indicator of items that could potentially be incorporated into future design, concept and PD&E scopes.

2. *Construction Costs* – Construction cost estimates prepared at major submittals will be tracked. Substantial variations in construction cost estimates are a powerful indicator of major scope changes or gaps.

3. *Consultant Grades* - The Consultants are graded on their performance and given guidance on ways to enhance a deficient score. This is an opportunity to provide positive feedback and illustrate a Consultant's progress and improvement.

Quality Assurance Procedures:

1. *Quality Control Plans* – If not already on file with the Turnpike, the Consultant is required to prepare an internal Quality Control Plan within 20 days of the written Notice to Proceed that will describe how the production team will meet the required quality control and quality assurance criteria. The plan describes the procedures to be used to verify, check and independently review all maps, drawings, specifications and other documentation prepared as part of the contract. The Consultant describes how the checking and review processes are to be documented to verify that the required procedures were followed. If a plan is already on file, the Consultant is tasked with submitting a letter stating they will follow the existing plan along with a quality control staffing plan specific to the project.

2. *Project Staffing* – The Standard Scope of Services and the TPPPH specifically outlines the project staffing requirements as they relate to quality control. The Consultant is required to utilize qualified production and review personnel to produce and review each element of scoped work. The processes require the documentation of the agreement between two qualified professionals in a given discipline. All responsible professionals are to be experienced, qualified, legally licensed (where applicable) and paired to provide the proper check and balance production and review process. Reviewers are to have the qualifications necessary to assure that a quality product is delivered to the Turnpike.

3. *Production Checking Requirements* – The TPPPH sets forth a checking procedure utilizing appropriate completion checklists and self checking. This follows the tracking stamp and red, yellow, green procedure commonly used on FDOT projects. Prior to each submittal review, the responsible professional for each work element is to use this standard checking procedure to document their detailed checking of all work prepared under their direction.

4. *Quality Process Log* – As defined in the TPPPH and the standard scope of services, the designer shall maintain a quality process log. The log is used to monitor, track and document the production and review process for each element, work product and deliverable.

5. *QA Certification* – With each and every phase submittal, the Consultant Principal in charge is required to fill out and sign a Quality Assurance Review Certificate of Compliance. This Certification affirms that the quality control process as outlined in the TPPPH has been completed and "due or ordinary care" processes were followed in producing the submittal documents.

6. *Phase Submittal Site Review* – As part of the standard Turnpike design schedules, a field review may be scheduled following each phase submittal. This allows for the designer and Turnpike review staff to discuss and resolve issues with plans and existing conditions at hand.

7. *Comment Response Verbiage* – The Project Manager will explain the comment response verbiage philosophy – that the responses should be clear and concise with sufficient detail to bring closure. Responses such as "will investigate" or "will check with PM" are discouraged. Responses noting phone calls made or direction given are encouraged. This can be done at the kick-off meeting or with the first submittal.

8. *Comment Response Update* – Comment responses from the prior submittal will be updated and submitted with each major submittal, ensuring closure and reducing redundant comments.

9. *45-Percent Workshop* – For mid-size and larger projects and at the Turnpike Project Manager's discretion, a 45-percent workshop may be scheduled. The workshop comes after any changes to the geometry resulting from the 30-percent review have been incorporated. The primary focus of the meeting is to review and discuss traffic control and construction sequencing on a conceptual basis. This will help bring major items to the surface that, if discovered later in the process, may cause significant rework.

10. *Biddability Review* – This is a review of the construction documents prior to letting which identifies errors, omissions, conflicts, ambiguities, inaccuracies and deficiencies in and among the documents. This review is above and beyond the design quality review and focuses on pay items and uniformity among the plan quantities, computation book and the Construction Estimating Input forms.

11. *Electronic Deliverables* – The Turnpike has instituted the use of electronic deliverables. Inherent to this process are quality control checks and uniformity requirements of deliverables. This process encompasses all deliverables in a standard set of construction documents with the exception of architectural drawings.

12. *ERC System* – The Electronic Review Comment System (ERC) is a web-based system that documents, organizes and categorizes submittal comments and responses. This process improves efficiency and clarity. Furthermore, reports are generated noting deadlines for reviews and completion of comment responses.

13. *Resolution of Review Comments* – Before each phase submittal, the Turnpike PM shall work with the designer to ensure that all comments have been resolved and revisions and solutions incorporated from prior submittals. This will avoid redundant comments and wasted effort on the part of reviewers.

14. *PM Comment Review* – The Turnpike PM will review phase submittal comments to familiarize themselves with major issues and the overall quality of the plans. Furthermore, the PM should address conflicting comments and facilitate resolution prior to the designer responding.

15. *Ensure Plans Complete*– With input from major reviewers and the use of checklists, the PM should make an initial determination as to the percentage completion of each submittal. If plans are not complete to the phase submittal level then a resubmittal should be considered, depending on severity.

16. *Early Identification of Incentives* – Construction incentives and bonuses are included in the construction budget and subsequently have an impact on the work program. These incentives must be identified early to allow for inclusion into the work program in a timely manner, preferably during the gaming cycle.

7.0 ENVIRONMENTAL / PERMITTING

The Design Project Manager must receive all Environmental Certification documents from the Environmental Management Office prior to the production date of each project. These certifications include Contamination Impact, Public Involvement, Noise Impact and Cultural Resource Clearance. Once these documents are received, the Design PM fills out the "Environmental Certification/Coordination Checklist", signs it and facilitates the signing of the document by the EMO Manager.

In addition, environmental permits must be certified as complete before a project can be production ready. This means all environmental permitting must be approved, executed, and in hand prior to the production date. The permits are referenced as part of the project specifications and any project-specific construction related permit conditions must be addressed in the plans. Permit conditions may apply during construction, or place requirements on the performance of the facility once it is operational.

Objective

Complete processes to assure all environmental certifications are in hand prior to the production date. Obtain environmental permits within the constraints of the schedule and ensure the conditions of the permit are addressed.

Measures

1. *Facility Compliance* - Confirm that final construction plans address appropriate permit conditions and that final construction plans reflect Permit Plans approved by the Permit Agencies.

2. *Permit Agency Inspection* – Each Agency has the option to visit the facility once construction as-built plans are submitted. Depending on the complexity and impact of the project, the Agency will perform a confirmation of the as-built plans provided to them.

Quality Assurance Procedures

1. *Permitting Kickoff Meeting* – Environmental permitting staff will meet with the Consultant to brief them on Turnpike procedures and Agency requirements for the project. A consistent product is necessary to strengthen the relationship the Turnpike enjoys with the Permit Agencies.

2. *Permit Package Review* – The Permit Plans and documents will be reviewed by Turnpike prior to submission to the Agency for compliance with Scope of Services. Any deficient documents will be revised and resubmitted.
3. *Environmental Permitting Certification* – Once all permits are received, executed, and referenced in the Specifications, a Certification will be prepared stating the project is cleared for production.

4. *Contamination Impact Certification, Public Involvement Certification, Noise Impact Certification and Cultural Resource Clearance* – Once all environmental certifications are received a summary certification document will be prepared by the Design PM assuring that all environmental certifications are complete.

5. *Post Environmental Permits on FDOT FTP Site* – On the Production Date of a project all environmental permits are posted on the "Permits and Utility Work Schedules" File Transfer Protocol (FTP) site to allow a review by perspective contractors during their bid preparation process and to allow the successful contractor to become familiar with the permits prior to and during construction.

8.0 RIGHT-OF-WAY

Right-of-way issues are critical to a project because of their expense as well as being a milestone in the project schedule. The Turnpike has historically been very successful in meeting right-of-way schedules. The accuracy and completeness of the Right-of-Maps and Legal Descriptions are vital to timely and successful real estate acquisition.

Objective:

Continue the high level of quality that has historically been associated with the Turnpike Right-of-Way group by providing documents that are complete, accurate, and timely.

Measures:

1. *Documents on Time* – Right-of-Way's ability to meet the production and letting deadline is contingent upon timely delivery of right-of-way maps and legal descriptions. The date documents are delivered will be compared with the agreed upon schedule date and tracked.

2. *Right-of-Way Map Revisions* – When title searches and appraisals are performed, changes to the maps and legal descriptions may be required. An inordinate amount of revisions to the maps may indicate a lack of research on the part of the mapper.

Quality Assurance Procedures:

1. *Right-of-Way Coordination* – The Turnpike PM will coordinate with right-of-way early and identify issues that require special treatment or may delay the project schedule. Right-of-Way is included in all appropriate reviews, pertinent progress meetings and production meetings.

2. *Agreement Review Meetings* – For large projects requiring significant right-of-way acquisition and agreements with other entities, a separate meeting may be held to outline and review the status of all agreements and commitments. This meeting includes Right-of-Way staff and the Turnpike PM and occurs between the Phase II and III submittals.

3. *Phase Reviews* – Right-of-Way staff are included in the distribution for selected phase reviews. They review plans for compliance with right-of-way requirements as shown in the Scope of Services, and examine the plans for right-of-way deficiencies.

4. *Commitments Website* – See Section 10.0 Construction. These commitments are tracked through the ProjectSuite Enterprise Edition application on the Turnpike website.

9.0 UTILITIES

Utilities should be certified before a project is let for construction. Therefore, their importance is heightened as this could affect the overall project schedule and Turnpike Agenda Package commitments. Furthermore, the utility process must be completed with a high degree of due care to avoid the costly errors and claims that are so often associated with unforeseen utility impacts.

Objective:

Obtain utility certification in a timely manner to not affect the project production date while maintaining every due care effort to avoid unforeseen utility impacts during construction.

Measures:

1. *Utility Certification on Time* - The date the Utility Certification is completed will be compared with the agreed upon schedule date and tracked to determine the overall efficiency of the project.

2. *Construction Supplemental Agreements and Requests for Additional Information (RAIs)* – Additional work or delays relating to utility conflicts are tracked and the cause analyzed for future utility coordination efforts and enhancements.

Quality Assurance Procedures:

1. *Utility Kick-off Meeting* – For large, complex or projects utilizing inexperienced firms, a utility kick-off meeting may be held with the consultant firm(s) responsible for utility coordination. The meeting includes not only the Consultant Project Manager but the Consultant's staff that will be doing the actual utility coordination as well. The meeting covers the approach to coordination, major items of concern, schedules and clarification of expectations.

2. *Monthly Status Sheets* – Each Consultant is required to submit monthly status sheets detailing utilities within the project limits and those additional utilities impacted by the project. At a minimum, the status sheet lists meetings held, plans sent and received and the status of any agreements.

3. *Phase Reviews* – Utility staff are included in the distribution for all phase reviews. They review plans for compliance with utility requirements shown in the PPM and the Scope of Services.

4. *Bi-Weekly Coordination* – The Utility Manager assigned to each project monitors the progress of the utility coordination by the designer. This includes bi-weekly coordination by phone or email to monitor progress as well as provide guidance and training as needed. The Consultant is responsible for contacting the utilities and resolving any identified conflicts.

5. *Certification Guidelines* – The Utility Office develops and provides guidelines to each consultant outlining the documentation required for utility certification.

6. *Utility Certification* – The Consultant firm responsible for the utility coordination is responsible for certifying that utility coordination has been completed. The utility certification is signed by the Principal in Charge or Engineer of Record.

7. *Agreement Signature Authority* – The Turnpike Enterprise and the Turnpike Enterprise Utility Office retain signature authority for all agreements and schedules. Schedules and agreements are reviewed for accuracy and completeness prior to signature.

10.0 CONSTRUCTION

Construction is Production's initial customer as they implement the documents produced during design. Having a quality set of construction documents not only eases construction and generates a better overall product, but also saves money and resources in the form of reduced claims and efficient use of Construction Management staff. A majority of the measures outlined below are aimed at creating pathways of information and understanding between Production and Construction and taking measures to ensure constructability.

Objective:

Create an open atmosphere of coordination and cooperation between Production and Construction and implement processes that produce constructible plans with minimal claims and delays.

Measures:

1. *Errors & Omissions* – The number and extent of Errors & Omissions identified by Construction personnel resulting in premium cost provides an overall indicator of plans quality and completeness.

2. *Constructability Grades* – For all professional services contracts resulting in construction plans, the Turnpike Construction Project Manager assigns a grade for the design consultant's plan quality. This grade will be tracked as an indication of the practicality, accuracy, completeness and cost effectiveness of the Consultant's contract plans set.

Quality Assurance Procedures:

1. *PMs Attend Partnering Meetings* - The Turnpike PMs are encouraged to attend partnering meetings when their projects reach construction. This will help foster mutual understanding

of design and construction issues and answer many design related questions before they get elevated.

2. *Construction Involvement in PD&E* – For particularly large or complex projects, a representative from construction is asked to participate in the initial alternative analysis and field reviews. This helps avoid selecting an alternative that is not constructible, maintainable or feasible from a traffic control standpoint.

3. *PMs Attend Monthly Construction Meeting* – By encouraging the Turnpike PM to attend at least one of the monthly construction meetings per year will help foster an atmosphere of collective understanding. Project Managers may become aware of construction issues that can be readily accommodated during design and vice versa.

4. *Construction Program Manager/Director of Operations Attend Production Meeting* – Similar to the above, the presence of the Construction Program Manager and/or Director of Operations at one of the monthly production meeting annually will inform construction of project status in design and issues that may relate to construction. This helps grow a collective understanding between design and construction.

5. *Commitments Website* – Often construction related commitments are made and criteria outlined during Planning, Concepts, PD&E and/or Design that must be carried through construction. To assure that all construction related commitments take place, a web based application has been developed that lists and outlines all the various commitments and criteria set forth during the earlier phases of the project. These commitments are tracked through the ProjectSuite Enterprise Edition application on the Turnpike website.

6. *Construction QA Plan* – Turnpike Construction has developed a Quality Assurance Plan outlining areas of concern, goals and procedures for measuring effectiveness. The Construction Quality Assurance Plan and the Production Quality Assurance and Business Practices Plan will be reviewed periodically to ensure common direction and general cohesiveness.

7. *Project Turnover Meeting* – Once the Construction Engineering & Inspection (CEI) consultant for construction is selected, a meeting, initiated by the Turnpike Production PM, should take place between design and construction. This meeting will act as an "information dump" of project issues and major concerns. This effort should help create a smooth and open transition from design to construction and establish a relationship between the Engineer of Record and the CEI Engineer.

8. *Construction Reviews* – Construction personnel are included in the submittal review distribution. This affords Construction the opportunity (at least 4 reviews) to review for constructability and phasing issues and to know what projects are on the horizon. For larger jobs, Construction may request an additional week review time from the PM to provide sufficient opportunity to do a thorough review. An additional informal submittal may be requested of the Consultant should insufficient information exist at the 60% level to comfortably determine constructability.

9. *Constructability Reviews* – For particularly large and/or complex projects, the Turnpike PM may elect to hold a separate and thorough constructability review. This review is more in-depth than the regular submittal reviews by construction and can solicit input and participation from the Consultant and/or outside professionals.

10. *Maintenance Reviews* - Similar to construction, maintenance personnel are included in the normal phase submittal review distribution to ensure that designs are not only constructible but maintainable as well. Separate meetings with maintenance to review maintainability are another option at the Turnpike PM's disposal.

11. *Errors and Omissions* – The Turnpike has an established procedure for tracking and enforcing errors and omissions (E&O) recovery. E&O staff tracks supplemental agreements and their status. The E&O Committee is informed when premium costs are incurred by the department that should be considered for recovery. The design issue is brought to the Committee's attention for review and decision once the Design Engineer has obtained the Consultant's position. By enforcing E&O recovery for avoidable mistakes, the Turnpike sends a strong message to Consultants that they will be held accountable for the quality, accuracy and completeness of their plans. Once a supplemental agreement is processed, the information is entered into the Resolution Tracking System (RTS). Furthermore, with the Director of Production serving as the E&O Committee Chair, major problems and recurring issues are identified and can be shared with production personnel, avoiding repeat errors.

12. *Construction Closeout Conferences* – Once a project is complete and operational, a construction closeout conference is held with involved construction personnel and the Production Project Manager to discuss issues that occurred, errors that were found and improvements that could be implemented in the future. The PM documents the major concerns and suggests improvements for corrective measures to be implemented.

13. *PM Support* – During construction, the Turnpike PM is available to provide support and insight from the design perspective on an as-needed basis. The PM also monitors Construction Requests for Information (RFI) and coordinates responses from the Consultant.

14. *Shop Drawing Management* – Shop drawings are submitted and managed through the Turnpike Shop Drawing Coordinator. This system provides for efficient and effective review, response and approval of shop drawings by technical staff in a timely manner.

15. *Lessons Learned Webpage* – Issues arising during construction that could have been avoided with proper design and coordination are identified and documented as a "Lesson Learned". These Lessons Learned are categorized per discipline and posted on the Turnpike website for reference and training.

APPENDIX

Quality Assurance and Business Practices Plan
Project Manager's Summary

Project Name:	_____	Project Manager:	_____
FPID:	_____	Production Date:	_____
County:	_____	Letting Date:	_____

Management

1. Was the project on the Agenda Package?
   a. If so, was the Agenda Package commitment met? Yes ◯ No ◯
   b. If no, was the original letting commitment met? Yes ◯ No ◯

Concepts and PD&E

2. What is the percent difference between the Concept/PD&E estimate and the final construction estimate?
   a. Concept/PD&E Estimate: _____
   b. Final Engineer's Estimate: _____
   c. Percent Difference: _____

3. What is the percent difference in area between the Right-of-Way identified in the PD&E and the final acquired Right-of-Way?
   a. PD&E Right-of-Way Area: _____
   b. Final Right-of-Way Area: _____
   c. Percent Difference: _____

4. What is the percent difference in costs between the mitigation needs identified in the PD&E and the final mitigated costs?
   a. PD&E Mitigation Costs: _____
   b. Final Mitigation Costs: _____
   c. Percent Difference: _____

Plan Preparation and Design

5. What is the total number of Unforeseen Supplemental Agreements? _____

   a. Attach a brief description of each of the SA's included above.

6. Were there major variations in construction cost estimates?

   a. Work Program Construction Estimate: _____
   b. 30-Percent Construction Estimate: _____
   c. 60-Percent Construction Estimate: _____
   d. 90-Percent Construction Estimate: _____
   e. 100-Percent Construction Estimate: _____

   Greatest Consecutive Percent Change _____

Construction

7. Were there any Errors & Omissions claimed requiring premium price during construction?
   a. Number of E&O claimed: _____
   b. Total cost of E&O claimed: _____

8. What was the final constructability grade given by the Construction PM? _____

Right-of-Way

9. Were documents delivered to Right-of-Way on schedule?
   a. Scheduled date documents to R/W: _____
   b. Actual date documents to R/W: _____

Utilities

10. Was the Utility Certification delivered on schedule?
    a. Scheduled Utility Certification date: _____
    b. Actual Utility Certification date: _____

Permits

11. Was the Environmental Permitting Certification delivered on schedule?
    a. Scheduled Environmental Permitting Certification Date: _____
    b. Actual Environmental Permitting Certification Date: _____