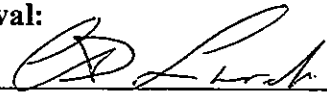
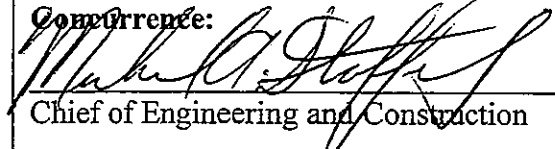


**QUALITY ASSURANCE PROCEDURES
TABLE OF CONTENTS**

PROC. NO.	TITLE	REV.	DATE
	TABLE OF CONTENTS	B	9/30/03
QAP-3.1	QUALITY SYSTEM	A	9/30/03
QAP-3.2	FORMAT, CONTENT AND STYLE OF QAPs	A	9/30/03
QAP-5.1	DOCUMENT CONTROL	A	9/30/03
QAP-9.1	INSPECTION	A	9/1/96
QAP-12.1	PROBLEM IDENTIFICATION AND RESOLUTION	A	9/30/03
QAP-13.1	CORRECTIVE ACTION	A	9/30/03
QAP-14.1	QUALITY RECORDS	A	9/30/03
QAP-15.1	AUDITS	A	9/30/03
QAP-16-1	TRAINING AND CERTIFICATION OF INSPECTORS	A	9/30/03

QUALITY ASSURANCE PROCEDURE	No.QAP-3.2
TITLE: FORMAT, CONTENT AND STYLE OF QUALITY ASSURANCE PROCEDURES	Rev. A
	Date: 9/30/03
Approval:  Deputy Director of Design & Construction-Quality Assurance	Concurrence:  Chief of Engineering and Construction

1.0 PURPOSE

This procedure defines the requirements for the format, content, and style of Quality Assurance Procedures (QAP).

2.0 SCOPE

This procedure applies to QAPs prepared for FTA granted projects and those projects selected by MBTA management.

3.0 REFERENCES

- 3.1 FTA Quality Assurance and Quality Control Guidelines, Element-2
- 3.2 Quality Assurance Program Manual, Section 3,
- 3.3 Quality Assurance Procedure, QAP 14.1 "Quality Records".

4.0 ATTACHMENTS

- 4.1 QAP Log
- 4.2 QAP Cover Sheet
- 4.3 Change Notice

5.0 GENERAL

5.1 Background

The requirements contained within are designed to provide the preparers and users with a uniform approach to the style of QAPs. The format provided in Section 6.0 is not intended to be strict

requirements and may vary if the need arises.

- 5.2 The Deputy Director of Design & Construction, Quality Assurance is responsible for approving the preparation of new QAPs and for assigning preparers. Preparers may be from other organizations. Schedules to control QAPs during preparation will be developed as appropriate.
- 5.3 A log shall be maintained of QAPs, Attachment 4.1. The log shall include the title, number and revision level of each QAP issued or in preparation.

6.0 PROCEDURE

6.1 Preparation

The preparer shall obtain the next sequential number from the QAP log, Attachment 4.1 and enter the appropriate information. Background information shall be gathered from appropriate sources such as FTA requirements, the Quality Assurance Program Manual, Standard and project specifications and any other available sources to assist in the development of workable and effective procedures. End users should also be consulted to assure workability of systems. Once all the information is gathered the preparer shall use the following format:

- Cover Sheet, Attachment 4.2.
- Section 1.0 PURPOSE - A brief reason as to why the procedure is being written and what it contains.
- Section 2.0 SCOPE - A statement indicating the projects to which the procedure is applicable. Also provide any limiting statements if the contents are only applicable to specific items. Example: The scope of this procedure is limited to only QAPs and not other procedures prepared by Quality Assurance.
- Section 3.0 REFERENCES - List any manual, procedure, or document which contain instructions or directions which are relevant, such as those needed to the accomplish the tasks covered by the procedure or provide information necessary to understand the process being discussed.
- Section 4.0 ATTACHMENTS - List any form, information

or document required to accomplish the tasks discussed by the procedure.

Note: For both REFERENCES AND ATTACHMENTS, the order in which they appear in the text should be the same order they appear in their respective Sections (i.e. Reference 2.1 should be discussed before Reference 2.2 in the text).

- Section 5.0 GENERAL - This Section should be used to provide background information, definitions and responsibilities assigned in the Procedure Section 6.0.
- Section 6.0 PROCEDURE - Provide the detailed steps necessary to accomplish the task(s) covered by the procedure. The steps should be described in sequential or chronological order and contain clear instructions to allow the user to understand and carry out their assigned responsibilities.
- Section 7.0 RECORDS - List only those documents that must be retained as Quality Assurance Records. Keep in mind that not every piece of paper is required to be retained as a Quality Assurance Record. Reference 3.3 contains the Records requirements.

6.2 Change Notices

Change notices, Attachment 4.3, will be prepared when minor corrections must be made to the text of a QAP. If changes are extensive, then a revision of the procedure should be prepared. Change Notices shall be prepared using the following format:

- Section 1.0 PURPOSE - A brief explanation as to why the procedure is being changed.
- Section 2.0 CHANGE - It is preferable that new pages with the changes already made be provided to the end users. If new pages are not provided then a detailed paragraph by paragraph explanation of exactly what the changes are must be given. Give clear directions to allow the users to understand what words or paragraphs need to be changed.

7.0 RECORDS


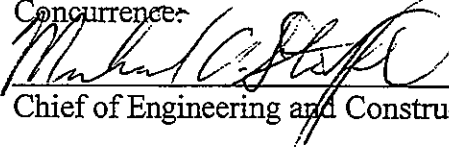
7.1 QAP Log

7.2 Issued QAPs (Originals, Revisions and Change Notices)

QUALITY ASSURANCE PROCEDURE		No.QAP-
TITLE:		Rev.
		Date:
Approval:	Concurrence:	
<hr/> Deputy Director of Design & Construction, Quality Assurance	<hr/> Chief of Engineering and Construction	

QUALITY ASSURANCE PROCEDURE		No.QAP-
TITLE:		Rev.
		Date:
Approval: _____ Deputy Director of Design & Construction, Quality Assurance	Concurrence: _____ Chief of Engineering and Construction	

CHANGE NOTICE

QUALITY ASSURANCE PROCEDURE		No.QAP-5.1
TITLE: DOCUMENT CONTROL		Rev. A
		Date: 9/30/03
Approval:  Deputy Director of Design & Construction, Quality Assurance	Concurrence:  Chief of Engineering and Construction	

1.0 PURPOSE

To describe the methods to control documents which specify quality requirements or prescribe activities affecting quality.

2.0 SCOPE

This procedure applies to all FTA backed projects and those projects selected by MBTA management to require document control measures.

3.0 REFERENCES

- 3.1 FTA Quality Assurance and Quality Control Guidelines, Element 4, "Document Control"
- 3.2 Quality Assurance Program Manual, Section 5.0 "Document Control"
- 3.3 Quality Assurance Procedure, QAP 3.1 "Quality System"
- 3.4 Quality Assurance Procedure, QAP 14.1 "Quality Records"

4.0 ATTACHMENTS

None

5.0 GENERAL

5.1 Background

References 3.1 and 3.2 require that documents which specify, implement or record

activities affecting quality shall be controlled. The control system shall be documented and provide for:

- identification of documents to be controlled
- approval status
- effectivity
- revision status
- completion status
- distribution control

These essential conditions provide a level of assurance that documents and changes thereto have been approved for use, the distribution of the documents is controlled, and the latest revision of the document is the one being used at the jobsite.

5.2 Responsibilities

The Project Manager is responsible to assure that consultants and contractors have document control procedures as each organization becomes party to the project.

Each MBTA organizational element has the responsible to identify documents prepared by their organization which require these control measures.

6.0 PROCEDURE


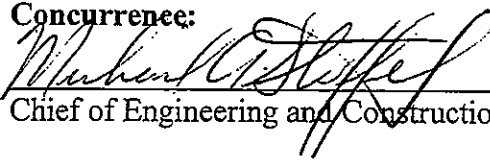
Organizations responsible for control of documents will establish document control procedures which provide for:

- Identifying documents to be controlled.
- Maintaining distribution lists.
- Measures to assure the adequacy, completeness, and correctness of documents prior to approval and issuance.
- identifying those responsible within the organization for preparing, reviewing, approving, and issuing documents.

Reference 3.3 contains a listing of Manuals and procedures which require document control procedures.

7.0 RECORDS

Documents generated as a result of this procedure are considered QA Records and shall be maintained in accordance with Reference 3.4.

QUALITY ASSURANCE PROCEDURE		No.QAP-9.1
TITLE: INSPECTION		Rev. A
		Date: 9/30/03
Approval:  Deputy Director of Design & Construction, Quality Assurance	Concurrence:  Chief of Engineering and Construction	

1.0 PURPOSE

To establish the methods for planning, performing and documenting inspections.

2.0 SCOPE

This procedure is applicable to FTA granted projects and those projects selected by MBTA management.

3.0 REFERENCES

- 3.1 FTA Quality Assurance and Quality Control Guidelines, Element 8, "Inspection and Testing".
- 3.2 Residents Engineer's Manual.
- 3.3 Quality Assurance Procedure QAP 12.1, "Problem Reporting and Resolution".
- 3.4 FTA Quality Assurance and Quality Control Guidelines, Element 11, "Nonconformances".

4.0 ATTACHMENTS

- 4.1 Concrete Placement Card
- 4.2 High Strength Bolting Checklist
- 4.3 Expansion/Epoxy Embedded Anchors Installation and Inspection Report
- 4.4 Field Grouting Inspection Report
- 4.5 Grouting Inspection Report

- 4.6 Material Receiving Inspection Report
- 4.7 Post Tensioning Inspection Report
- 4.8 Nuclear Method Compaction Test Report

5.0 GENERAL

5.1 Background

All materials used on a job and each part or detail of the work is subject to inspection. The Contract Specification will define those inspections to be performed by the inspectors and the hold and notification points required to be observed by the contractor. It is extremely important that inspectors become familiar with the Contract Specification and those inspections and tests required to be performed, who will perform them and how these inspections and tests will be documented.

Documentation of inspections is a key element of any quality assurance program and the ability to track both satisfactory and unsatisfactory items. References 3.1 and 3.4 require FTA granted projects to meet certain guidelines regarding performing and documenting inspections and test.

5.2 General

The inspector's Diary is the primary MBTA inspection document. There will be other documents which supplement the inspections noted in the Diary, such as Attachments 4.3 through 4.6

Unsatisfactory inspections and test results will be transmitted to the contractor orally, Then followed up with a Resolution Report.

5.3 Definitions

- Deficiency - The condition of an item that indicates it does not meet specified requirements but can be corrected within the specification requirements through rework.
- Hold Point - A point in a function or process at which inspection is planned to be performed, and beyond which work may not proceed without prior approval from the Resident Engineer.
- Notification Point - A point in a function or process at which inspection may be performed. The inspection organization must be notified at this

point and work may proceed, but the inspection action or final release may be delayed by the inspection organization. (Example Contractors placing concrete are required to notify the Quality Assurance Lab before 3 P. M. the day prior to the placement. Once the QA Lab has been notified, the placements may proceed.)

- Rework - The act of correcting a deficiency to the original requirements through reprocessing, reassembly, remachining, reinstallation, or completion of the required operations.

6.0 PROCEDURE

6.1 Inspection Planning

The Resident Engineer and inspectors shall plan inspections by reviewing the Contract Specification, drawings and schedules and become familiar with inspection and test requirements and the sequence of construction. Additionally, inspection requirements for job performance contained within the Resident Engineer's manual and the Quality Assurance Procedures Manual should be reviewed. The Resident Engineer and inspector shall assure that the inspection process is coordinated with the contractor and other MBTA inspection groups to assure that appropriate personnel are available to perform the required inspections.

The inspector should be mindful of and identify any "Hold" or "Notification" points required by the contract and understand the process by which these notifications will be given. The inspector should also become familiar with those inspections and tests to be performed by other MBTA inspectors and the manner in which these inspections will be documented.

The inspector may chose to develop checklists to aid in the inspection process. Whether or not checklists are used, a clear understanding is required of what inspections will be performed and to what acceptance criteria.

6.2 Performance

Inspectors shall conduct inspections and tests as required by the Contract Specification. All requirements for frequency of tests and acceptance/rejection criteria shall be followed. The inspector shall assure that all inspections are performed when required and properly documented. The Resident Engineer shall be immediately notified if any "Hold" or "Notification" point was not observed.

6.3 Reporting of Inspection Results

Special inspections will be recorded in the inspector's Diary.

If the results are unsatisfactory, the inspector shall proceed as follows:

- If the condition can be corrected by rework, the Inspector may notify the contractor orally that a deficiency exists as long as it will be corrected immediately. If the deficiency will not be corrected immediately, then the Inspector will notify the RE who will issue a Resolution Report in accordance with Reference 3.3.
- If the condition cannot be corrected by rework, then a nonconformance will be prepared, forwarded to the Resident Engineer and tracked in accordance with Reference 3.3. An entry shall be made in the Diary referencing the Nonconformance number.

7.0 RECORDS

The following documents are considered Quality Assurance records and shall be maintained in the Resident Engineer's File:

- Inspector's Diary
- Supplemental Inspection Reports (Attachments 4.2 through 4.8, as applicable.)
- Corrective Action documentation relating to deficiencies.



CONCRETE PLACEMENT CARD

DATE:	CONTRACTOR:	CONTRACT NO.
CONCRETE PLACEMENT		SCHEDULED PLACEMENT DATE:
STRUCTURE	ELEVATION: FROM	TO
ACTUAL PLACEMENT	TIME:	START: FINISH:
TYPE MIX:	ESTIMATED QUANTITY-CY	ACTUAL
PLACEMENT FOREMAN:	MBTA INSPECTOR	
CONTRACT DOCUMENTS:		
REMARKS:		

PREPLACEMENT CHECKS

ITEM	CONTRACTOR INSPECTOR	MBTA INSPECTOR	REMARKS
EXCAVATE AND SUBGRADE			
FORMS - LINE AND GRADE			
FORMS - BRACED, READY TO POUR			
RE-STEEL - QUANTITY/LOCATION/TYPE			
RE-STEEL - SECURE AND CLEAN			
WATER STOPS/SEALS, JOINT PREP.			
PIPE - QUANTITY-SECURE-ELEV.			
ELEC. CONDUIT-QTY-SECURE-ELEV.			
GROUND WIRE			
ANCHOR BOLTS & RODS/EMBED ITEMS			
FORMS HEATED IN COLD WEATHER			
COLD WEATHER CURING PRECAUTIONS			
CLEAN-UP INSIDE FORMS			
METHODS OF CURING			
SLURRY			
GUIDE WALLS IN TOLERANCE			
BENTONITE SLURRY TESTING			
OTHER (IDENTIFY)			
O.K. TO PLACE CONCRETE		MBTA INSP.	DATE:



HIGH STRENGTH BOLTING CHECKLIST ROTATIONAL CAPACITY TEST

DATE: _____

DATE OF TEST	CONTRACTOR
CONTRACT NO.	PAY ACTIVITY
SUBMITTAL	TEST NO.

ITEM TESTED

SIZE AND DESCRIPTION	MFG.	MARKING	LOT NO.	FINISH
BOLT				
NUT				
WASHER				

ROTATIONAL CAPACITY LOT NUMBER: _____

TEST RESULTS

	RESULT TEST 1	RESULT TEST 2	PASS		FAIL	
MINIMUM TENSION REQUIRED						
TORQUE AT MINIMUM TENSION						
TENSION AFTER FULL ROTATION						

COMPUTED TORQUE VALUE: _____

TEST WAS CONDUCTED USING: SKIDMORE SERIAL NO.: _____ CAL. DATE: _____
 SOLID PLATE

TORQUE WRENCH USED: SERIAL NO.: _____ CALIBRATION DATE: _____

DEGREE OF ROTATION: _____

REMARKS:

● RCL TEST SHEETS FOR ALTERNATE DESIGNED FASTENER WILL BE FURNISHED UPON REQUEST

CONTRACTOR REPRESENTATIVE _____ DATE _____

MBTA _____ DATE _____



EXPANSION/EPOXY EMBEDDED ANCHORS INSTALLATION AND INSPECTION REPORT

DATE: _____

CONTRACT NO.: _____ CONTRACTOR: _____

ATTACHMENT LOCATION: _____

DRAWING/REV.: _____

SUBMITTAL: _____

PAY ACTIVITY: _____

TYPE, SIZE, NUMBER OF ANCHORS: _____

PREPLACEMENT CHECKS

INSPECTOR CHECKPOINTS	CONTRACTOR	DATE	MBTA	DATE
CONCRETE SURFACE				
ANCHOR HOLE LOCATION SURVEY AND MARKED				
EPOXY INJECTION SATISFACTORY				
TEMPERATURE RANGE SATISFACTORY				
TORQUE TEST				
ANCHORS INSTALLED CORRECTLY				

TEST WRENCH ID: _____ CALIBRATION DUE DATE: _____

REMARKS:



FIELD COATING INSPECTION REPORT

DATE: _____

CONTRACT NO.: _____ CONTRACTOR: _____

LOCATION: _____

ITEM DESCRIPTION: _____

COATING DATE: _____ 1ST 2ND 3RD

AREA INSPECTED: _____

SUBMITTALS: _____ DRAWING/REV.: _____

PAY ACTIVITY: _____

INSPECTIONS	CONTRACTOR	DATE	MBTA	DATE
SHELF LIFE/STORAGE TEMPS NOT EXCEEDED; UNOPENED ORIGINAL CONTAINERS WITH LABELS. BATCH NUMBER _____				
SURFACES TO BE COATED ARE CLEANED OF OIL, GREASE AND OTHER DETRIMENTAL MATERIAL				
TOUCH UP BARE OR ABRADED SURFACES WITH APPROVED COATING				
FIELD CONNECTIONS (WELD, BOLTING) SURFACES CLEANED AND PROFILED PRIOR TO PRIMER				
MATERIALS MIXED AND PREPARED TO MANUFACTURER'S RECOMMENDATIONS				
APPLICATION TO MANUFACTURER'S SPECIFICATIONS				
CURE TIME ACHIEVED PRIOR TO COATING				
COLOR AS SPECIFIED				
COATING THICKNESS (DFT) REQUIRED ACTUAL _____ _____				

ENVIRONMENTAL RECORD
 SURFACE TEMP _____ HUMIDITY _____
 AMBIENT TEMP _____ DEW POINT _____
 SURFACE CONDITIONS _____
 WEATHER CONDITIONS _____

REMARKS: _____



MATERIAL RECEIVING INSPECTION REPORT

CONTRACT NO.:	CONTRACTOR:
DATE:	REPORT NO.:
MATERIAL RECEIVED:	
DESCRIPTION:	
QUANTITY:	
SUBMITTAL NO.:	
ACTIVITY NO.:	
MANUFACTURER/SUPPLIER	

RECEIVING INSPECTION REQUIREMENTS

REQUIREMENTS	RE Q'D	REQ'D	SAT	UNSAT	REQUIREMENTS	SAT	UNSAT	N/A
MATERIAL CERTIFICATION					PHYSICAL CONDITION			
CERTIFICATE OF COMPLIANCE					PACKAGING			
SPECIAL TEST REPORTS					CLEANLINESS			
MANUALS					IDENTIFICATION/MARKINGS			
OWNER RELEASE FORM								

STORAGE AND MAINTENANCE REQUIREMENTS:

MATERIAL COMPLIES WITH CONTRACTURAL REQUIREMENTS: YES NO

COMMENTS:

CONTRACTOR REPRESENTATIVE

DATE:

MBTA REPRESENTATIVE

DATE:



POST TENSIONING INSPECTION REPORT

DATE _____

CONTRACT NO.:

CONTRACTOR:

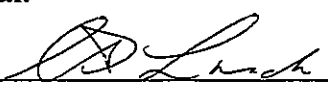
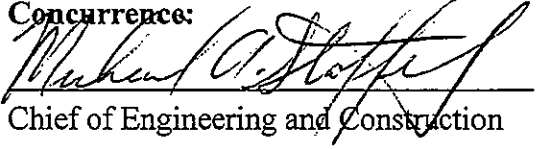
DRAWING/REV.:

SUBMITTALS:

IDENTIFICATION/DUCT NUMBER:

PAY ACTIVITY:

	INSPECTION	CONTRACTOR	DATE	SURVEY		MBTA	DATE
				CONT	MBTA		
PLACEMENT	ELEVATION OF DUCT						
	DUCT PROFILES SMOOTH & CORRECTLY SHAPED						
	DUCT JOINTS MATED & SEALED WITH DUCT TAPE						
	ALL HOLES IN DUCT REPAIRED						
	SECURED TO PREVENT DISPLACEMENT DURING CONCRETING						
	DRAINS INSTALLED AT LOW POINTS						
	VENTS INSTALLED AT HIGH POINTS						
	BEARING PLATES SECURELY ATTACHED, ELEVATIONS & CONFIGURATION						
TENSIONING	ANCHOR HEADS FREE FROM CORROSION						
	WEDGES FREE OF RUST & STEEL SHAVINGS						
	PRESTRESSING STEEL FREE FROM CORROSION AND PROTECTED						
	EACH DUCT HAS THE SAME HEAT/REEL NUMBER INSTALLED						
	TENDONS STRESSED SLOWLY- <input type="checkbox"/> ONE END <input type="checkbox"/> BOTH						
	WEDGES SEATED EVENLY						
	TAILS CUT BY SAW						
	EQUIPMENT ID _____						
	HEAT/REEL # _____						
	ELONGATED MARK INITIAL _____ FINAL _____						
	FINAL ELONGATION REQUIRED _____ ACTUAL REQUIREMENT _____ 5% MAX						
	Final Tension _____						
REMARKS							

QUALITY ASSURANCE PROCEDURE		No.QAP-12.1
TITLE: PROBLEM REPORTING AND RESOLUTION		Rev. A
		Date: 9/30/03
Approval:  Deputy Director of Design & Construction - Quality Assurance	Concurrence:  Chief of Engineering and Construction	

1.0 PURPOSE

To establish the methods to document and process requests for information from the Designer, design changes and nonconformances.

2.0 SCOPE

This procedure applies to all FTA granted projects and to projects of sufficient scope and complexity as determined by MBTA management.

3.0 REFERENCES

- 3.1 FTA Quality Assurance and Quality Control Guidelines-Element 3, "Design Control"
- 3.2 FTA Quality Assurance and Quality Control Guidelines - Element 11, "Nonconformances"
- 3.3 Resident Engineer's Manual

4.0 Attachments

- 4.1 Resolution Report
- 4.2 Request for Information
- 4.3 Request for Information Log (Sample)
- 4.4 Resolution Report Log (Sample)

5.0 GENERAL

5.1 Background

It is important that design criteria be appropriately understood and transmitted between the design and construction organizations on a project. Additionally, nonconformances must be appropriately documented, reviewed by the responsible organization, dispositioned properly, and corrective measures verified.

There are many situations that occur on a project where requirements contained in the contract specification and drawings need clarification. If one were to try to recreate how these conditions were resolved at a later date, it would be difficult without referring to some documentation. It is in these situations where the Request for Information and the Resolution Report would be helpful and should be used. Refer to Attachments 4.1 and 4.2. These forms can assist in clearly transmitting information, design criteria and documenting the nonconforming conditions. Additionally resolution of nonconforming conditions can be tracked on one piece of paper.

It is extremely important that these forms be used for their intended purposes since information requests require limited approvals and design changes and nonconformances require expanded reviews and approvals.

Design changes and nonconformances must be controlled and reviewed by the Project Manager and the Designer. Attachment 4.1 provides the means to identify the design change or nonconformance, control their processing, document resolutions and completion of corrective actions.

5.2 Definitions

Nonconformance - A deficiency in characteristic that renders the quality of an item or activity unacceptable or indeterminate and which cannot be corrected within the scope of the specification. The design organization must approve the correction of nonconformances.

Design Change - Any revision or alteration of the technical requirements defined by approved and issued design output documents, and approved and issued changes thereto.

Deviation: A departure from specified requirements.

6.0 PROCEDURE

- 6.1 Design changes and nonconformances shall be identified on Attachment 4.1 by marking the appropriate block to indicate the type of request. Complete instructions for preparing the Resolution Report are contained on Attachment 4.1. It is important that the problem description be filled out in enough detail to allow

for proper dispositioning by the Designer/Project Manager and facilitate the processing of the form. In cases of nonconformances, a clear statement of what requirements have been violated is required.

The Resident Engineer shall keep a log of all Resolution Reports. Resolution Reports requesting information or design changes should be kept separate from nonconformances.(see Attachments 4.2 and 4.3) For conditions identified which will result in a Contract Change, the Resident Engineer shall also follow the procedures contained in Reference 3.3 for documenting Contract Changes. The Resolution Report can be used to assist in the documentation of the change. Once logged, the form shall be forwarded to the Project Manager who will approve the Resolution Report by signing and dating the form. The form will then be forwarded to the Designer.

The Designer will provide the disposition of the problem. If the request was for information only and the Designer determines that a design change will occur, then the block marked "Design Change" shall be checked, the approval block signed, and the form returned to the Project Manager.

The Project Manager shall review the dispositioned Resolution Report to determine if it meets MBTA requirements. Quality Assurance shall concur in dispositions of nonconformances. Any areas of disagreement shall be resolved with the Designer. The Project Manager shall indicate concurrence with the resolution by signing and dating the form. The form will then be returned to the Resident Engineer.

The Resident Engineer shall update the Resolution Report Log and make distribution of the completed form as follows:

- Deputy Director of Design & Construction-Quality Assurance
- Contractor
- Project Manager
- Director of Construction

The original shall be filed in the Resident Engineer's file. If the Resolution Report represents a design change, it shall be filed in the specification file.

6.2 Nonconformances

The Resident Engineer shall assure that dispositions of nonconformance have been implemented and are verified by the Inspector after correction. The nonconformance will remain open until dispositions have been implemented and verified.

6.3 Requests for information (RFI), attachment 4.2 , shall be completed by the

contractor whenever a clarification of the design requirements is needed.

Note:

The RFI shall not be used to request a design change or document a nonconforming condition.

6.4 The Resident Engineer shall assure that Requests for Information are logged and tracked to completion. The log shall be maintained by either the Consultant or the Contractor. RFIs require the approval of the Project Manager as a minimum.

7.0 RECORDS

The following are considered QA Records:

- Resolution Reports
- Logs
- Requests for Information

RESOLUTION REPORT INSTRUCTIONS

BLOCK	INSTRUCTION
NO. REPORT TYPE (DESIGN CHANGE, NONCONFORMANCE CONTRACTOR CONTRACT NO. DOCUMENT	Resident Engineer : Insert consecutive number from log. Note: Log may be divided into categories, such as "CONCRETE," "MECHANICAL," "ELECTRICAL," etc., if desired. Originator: Check appropriate block Originator: Insert contractor's name Originator: Insert Contract No. Originator: Check appropriate block and identify document by
DESCRIPTION	Originator: Check appropriate block and identify document by number. Originator: Completely describe the condition, including, as appropriate: <ul style="list-style-type: none"> ● The specification, drawing, or document affected. Cite specific sections. ● The existing condition which is different from the original requirement. ● If the condition represents a nonconformance, provide reason why the condition exists and a proposed solution, if known. ● Provide a justification as to why the MBTA should accept the requested condition.
ORIGINATOR/DATE	Originator of Report: Sign and date block. The signature should represent the person who discovered the condition or is requesting the change. This may be a member of the Contractor's Organization, another MBTA Department or the Resident Engineer. If it is the Resident Engineer, mark this block "N/A" and sign in the RES. ENG. block.
RES. ENG/DATE	Resident Engineer: Sign and date block
DISPOSITION	Designer: Check if the approved condition will represent a design change or nonconformance. If a nonconformance, check the appropriate disposition. Provide a full explanation of the resolution to the requested problem. Indicate whether or not the disposition is a one time condition or generic. If the

	<p>specification does not include requirements on how to implement the disposition, then include the appropriate instructions. Include any limitations on the use of the disposition, such as one time only change.</p>
<p>PREVENTIVE ACTION</p> <p>DESIGNER/DATE RES. ENG</p> <p>PROJ. MGR.</p> <p>DEP. DIR. OF DES. & CONST. – QA CORRECTIVE/PREVENTIVE ACTION COMPLETE SECTION CONTRACTOR</p> <p>MBTA INSP.</p> <p>OTHER</p> <p>RES. ENG.</p>	<p>Designer: Describe those actions that are necessary to prevent the condition from recurring or those actions required to determine the extent of the condition.</p> <p>Designer: Sign and date Resident Engineer. Sign and date. If reinspection of the disposition is not required, mark N/A in the "MBTA INSP." block</p> <p>Project Manager: Sign and date and process any Contract Change Orders which may be required as a result of the Disposition.</p> <p>Dep. Dir. Of Des. & Const.-QA sign and date</p> <p>Contractor: Sign and date after the disposition has been completed. In the case of a nonconformance, forward the report to the Resident Engineer for reinspection.</p> <p>MBTA Inspector: Sign and date after reinspection is complete and satisfactory.</p> <p>Resident Engineer/Other MBTA Departments: The Resident Engineer will indicate which MBTA Department should review and concur in the disposition. If none, mark the block "N/A".</p> <p>Other MBTA Department: Sign and date when requested by the Resident Engineer.</p> <p>Resident Engineer: Sign and date after the MBTA Inspector and other organizations have signed the report. The Resident Engineer's signature indicates that the report is closed.</p>

MBTA RESOLUTION REPORT		NO.	
<input type="checkbox"/> DESIGN CHANGE		<input type="checkbox"/> NONCONFORMANCE	
CONTRACTOR:		CONTRACT NO.	
DOCUMENT :	<input type="checkbox"/> SPEC:	<input type="checkbox"/> DWG:	<input type="checkbox"/> OTHER
DESCRIPTION:			
ORIGINATOR:	DATE:	RES. ENG:	DATE:
DISPOSITION: <input type="checkbox"/> DESIGN CHANGE <input type="checkbox"/> NONCONFORMANCE <input type="checkbox"/> ACCEPT AS IS <input type="checkbox"/> REWORK <input type="checkbox"/> REPAIR			
PREVENTIVE ACTION:			
DESIGNER:	DATE:	RES. ENG:	DATE:
PROJ. MGR:	DATE:	DEP. DIR- QA :	DATE:
CORRECTIVE/PREVENTIVE ACTION COMPLETE			
CONTRACTOR:	DATE:	MBTA INSP:	DATE:
OTHER:	DATE:	RES. ENG:	DATE:



MBTA REQUEST FOR INFORMATION

RFI NO.

CONTRACTOR:

CONTRACT NO.

DOCUMENT AFFECTED:

SPEC:

DWG:

OTHER

DESCRIPTION:

JUSTIFICATION:

ORIGINATOR:

DATE:

PROJ. MGR.:

DATE:


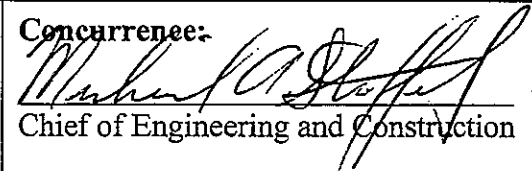
RESPONSE:

DESIGNER:

DATE:

PROJ. MGR.:

DATE:

QUALITY ASSURANCE PROCEDURE		No.QAP-13.1
TITLE: CORRECTIVE ACTION SYSTEM		Rev. A
		Date: 9/30/03
Approval:  Deputy Director of Design & Construction - Quality Assurance		Concurrence:  Chief of Engineering and Construction

1.0 PURPOSE

To describe the methods, requirements and actions required to identify conditions adverse to quality, determine their cause and provide effective corrective and preventive action.

2.0 SCOPE

This procedure is applicable to FTA granted projects and other projects determined by MBTA management. The corrective action system applies to any condition that requires special attention by the MBTA. The system applies when an adverse trend has developed, a discrepancy does not fit into another existing system, or when previous corrective measures have not been effective.

3.0 REFERENCES

- 3.1 FTA-MA-06-0189-92-1 Quality Assurance and Quality Control Guidelines-Element 12, "Corrective Action".
- 3.2 MBTA Quality Assurance Program Section 13 "Corrective Action Control".

4.0 ATTACHMENTS

- 4.1 Corrective Action Log

5.0 GENERAL

5.1 Background

The corrective action system is designed to provide assurance that conditions adverse to quality are identified, analyzed for cause, reviewed by appropriate personnel, corrective and preventive actions determined and tracked until closure. This system has additional benefits in that it provides a mechanism to transfer

information to other MBTA projects to preclude the same or similar condition from recurring.

5.2 Definitions

Condition Adverse to Quality - Any item identified which may have significant schedule impact, cause major cost increases to the project, require special attention or resources, affect the quality, or require action to preclude repetition. Examples of these items are:

- Design omissions or errors
- Unsatisfactory or tardy submittals
- Construction Deficiencies that have a significant impact on the project
- Nonconformances/noncompliances of a special nature
- Catastrophic events
- Repetitive deficiencies

If in doubt as to whether or not an item should be entered into the CA system, notify QA and they will assist in the determination.

Note:

Items which are identified and documented under the contractor/consultant QA/QC Programs are **not** considered MBTA Corrective Action Items.

6.0 PROCEDURE

Any person who identifies a corrective action item shall notify the Quality Assurance Department for inclusion in the corrective action system. A copy of the documentation (letter, RFI, speed letter, telecon, diary notes, deficiency or nonconformance report, etc.) that identifies the item should be provided. The documentation should include, as appropriate:

- Design or Construction contract number
- Location
- Description of the problem
- Apparent cause
- Organization(s) responsible for condition
- Date(s) when action is required to be completed

The Quality Assurance Department will log the corrective action item and establish a file containing the supporting documentation. A Responsible Organization will be assigned. The "Responsible Organization" is the action party who has the primary responsibility to resolve the condition by defining the actions necessary to correct the condition. The action party shall obtain the necessary documents which support corrective/preventive

action, provide QA with update information and assure corrective/preventive action is implemented.

As events occur, the action party shall update QA by forwarding copies of the appropriate documentation. QA will update the log and record file. The action party will also notify QA when corrective and preventive actions are complete. QA will verify their closure and effectiveness.

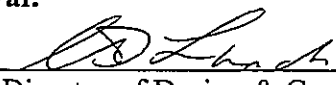
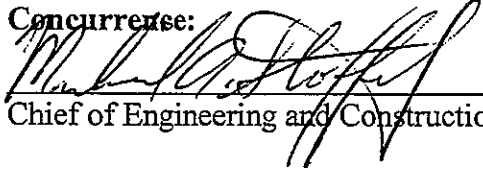
Note: An item will not be considered closed until both corrective and preventive actions have been completed and verified.

QA will issue the Corrective Action Log on a monthly basis to action parties and Project Managers. A special report will be issued quarterly which will provide a synopsis of all corrective action taken on open items since the previous quarterly report.

QA will notify the Project Manager of any actions which are overdue and request an explanation of the delay, including potential impact of late resolutions.

7.0 RECORDS

The Corrective Action Log and back-up files will be maintained by QA as quality assurance records.

QUALITY ASSURANCE PROCEDURE		No.QAP-14.1
TITLE: QUALITY RECORDS		Rev. A
		Date: 9/30/03
Approval:  Deputy Director of Design & Construction - Quality Assurance	Concurrence:  Chief of Engineering and Construction	

1.0 PURPOSE

To establish the requirements for the retention and storage of quality records.

2.0 SCOPE

This procedure applies to FTA granted projects and those projects determined by MBTA management. Quality records requirements are applicable from project inception until final job closeout (Completion of the Certificate of Inspection and Acceptance-Form 9).

3.0 REFERENCES

- 3.1 FTA Quality Assurance and Quality Control Guidelines, Element 13, "QA Records".
- 3.2 Quality Assurance Program Manual, Section 14, "QA Records"
- 3.3 Resident Engineer's Procedure, REP – 2.3, "Filing System/Records"
- 3.4 Project Management Manual, Section 12, Records Storage

4.0 ATTACHMENTS

NONE

5.0 GENERAL

5.1 Background

References 3.1 and 3.2 require that records which provide objective evidence that

design and construction activities were performed in accordance with contract specification requirements and the MBTA Quality Assurance program shall be maintained.

5.2 Responsibilities

- A. The Document Control Manager (DCM) is responsible for designating and maintaining Records Retention Facilities (RRFs). The DCM shall maintain a list of where each project stores its records. At the end of the retention period no record will be destroyed without prior approval of the Chief of Engineering and Construction.
- B. The Project Manager is responsible for assuring that project records are transferred to RRFs at the completion of the job. Additionally, the PM is responsible to designate the retention period for records and identify any records that must have special protection in the working files. Normally, Design and Construction records are maintained for a minimum period of (7) years.
- C. The Resident Engineer is responsible to maintain a file for all project activities in accordance with Reference 3.3.
- D. Other Department Managers are responsible to assure that records which they generate are turned over to the Project Manager at the completion of the job or when designated by the Project Manager.

5.3 Records Retention Facilities shall meet the following criteria:

- Areas shall have controlled access
- File cabinets shall be steel and fire resistant or other containers located in an area which will preclude damage from fire, condensation, and extreme temperature variation.
- Rodent and pest control.

5.4 Quality Records shall be identified by title, contract number, revision, activity description, date and signature, as appropriate.

5.5 Definitions

Record: A document generated during project execution that demonstrates how activities affecting quality have been performed. A document does not become a record until it has been completed and signed by authorized personnel.

Working Files: Files which are used to store documents and records during the day-to-day operation of the project.

Records Retention Facility: The permanent storage area for project records.

6.0 PROCEDURE

Each department or group that generates project records shall maintain a working file that affords basic protection for documents and records during project execution. Important documents and records shall be afforded fire protection. The Project Manager shall be consulted for a determination of which files should receive Fire protection. Documents and records shall be maintained in suitable filing cabinets, in a secure location with access limited to authorized personnel.


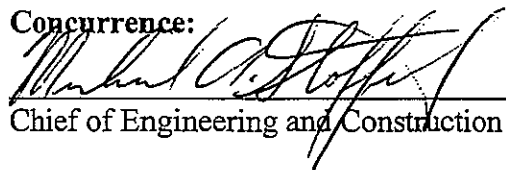
An index or other content identification (see Reference 3.3 for Project File Index) shall be maintained to allow for retrievability of documents. Records are not to be altered or changed without the consent of the parties who generated the record. In this instance, initials or signatures of the affected parties indicating acceptance of the changed record shall be affixed to the record.

Upon receipt of Form 9, Certificate of Final Inspection and Acceptance, custodians of records shall pack files in storage boxes which are marked with a list of the contents (See Reference 3.4 for details). Each box shall be numbered sequentially and have the Contract number clearly marked. The records shall be forwarded to the RRF as directed by the Project Manager.

The Project Manager shall request the Document Control Manager to provide a location for the storage of project records and shall assure that all project records are forwarded to this location at the completion of the project.

7.0 RECORDS

None

QUALITY ASSURANCE PROCEDURE	No.QAP-15.1
TITLE: AUDITS	Rev. A
	Date: 9/30/03
Approval:  Deputy Director of Design & Construction - Quality Assurance	Concurrence:  Chief of Engineering and Construction

1.0 PURPOSE

To describe the methods for performing MBTA quality assurance audits and to establish auditor qualification requirements.

2.0 SCOPE

This procedure is applicable to quality activities performed by the MBTA, its consultants and contractors during the execution of FTA granted projects and to those projects of sufficient scope and complexity as determined by the MBTA.

3.0 REFERENCES

- 3.1 FTA QA and QC Guidelines, Element 14 "Audits".
- 3.2 MBTA Quality Assurance Program, Section 15 "Quality Audits".
- 3.3 Quality Assurance Procedure QAP, 12.1 "Problem Reporting and Resolution".

4.0 ATTACHMENTS

- 4.1 Audit Schedule (Sample)
- 4.2 Audit Plan
- 4.3 Audit Checklist or Questionnaire
- 4.4 Audit Observation

5.0 GENERAL

5.1 BACKGROUND

Audits are performed to provide the MBTA with assurance that project activities are accomplished in accordance with the MBTA quality assurance program and

project quality requirements. This audit system is based on the requirements of References 3.1 and 3.2.

5.2 Definitions

Audit - A planned and documented activity performed to determine by investigation, examination, or evaluation of objective evidence the effectiveness of the program, its adequacy of and compliance with established procedures, instructions, drawings, and other applicable documents.

6.0 PROCEDURE

6.1 Planning

- A. Audits will be performed periodically to evaluate organizations performing quality activities on a project and to determine the effectiveness of the quality program. Audit schedules will be prepared and audits performed using audit plans and appropriate questionnaires or checklists. Audits plans, questionnaires and checklists will be prepared by the auditor as described in Attachments 4.2 and 4.3. An auditor will be assigned to perform each audit. If more than one auditor is assigned then the audit will be performed under the direction of a lead auditor.
- B. The auditor assigned will be responsible for all elements of the audit. Auditors are to have no direct responsibility in the activities to be audited and will possess the necessary experience or training commensurate with the scope, complexity and nature of the activities to be audited.

6.2 Notification

Each organization will be notified sufficiently in advance to allow for planning and to assure that the appropriate people are available during the audit. This notification will include the date of the audit and a description of the areas and subjects to be covered.

6.3 Audit Performance

- A. A pre-audit conference will be held with the management of the audited organization to discuss the audit scope, introduce the auditor(s) and establish lines of communication.
- B. During the conduct of the audit, the auditor will keep management aware of the progress of the audit and identify items of noncompliance. Hardware noncompliances shall be identified and processed on a Resolution Report in accordance with Reference 3.3.

- C. At the conclusion of the audit, a post-audit conference will be held with the management of the audited organization to discuss the results of the audit and present its conclusions.

6.4 Audit Reporting

A formal audit report will be issued to the head of the audited organization within 15 days of the audit. In cases where contractors or consultants are audited, an information copy will be sent to them in addition to the formal notification through the Project Manager. The report will include references to:

- The persons performing the audit.
- The organization audited and the operation(s) reviewed.
- The personnel, documents, and location of the areas reviewed.
- The acceptability or unacceptability of each area audited. Audit deficiencies shall be documented on an Audit Observations form Attachment 4.4.
- Reference to any nonconformance report generated.

6.5 Corrective Action

Corrective action responses shall be forwarded to the auditor within 21 days of receipt of the audit report. The auditor is responsible for accepting or rejecting corrective action responses. If circumstances prevent timely response to the audit, the audited organization will resolve these instances with the auditor. These cases will be appropriately documented in the audit file.

6.6 Audit Closure

When the audit is deemed complete, the auditor will assure that the files are complete and contain sufficient documentation indicating how each observation was closed.

6.7 Follow-up

The auditor is responsible for scheduling follow-up audits when required to verify completion and effectiveness of corrective actions. Any deficiencies discovered during follow-up audits will be handled as described above.

6.8 Problem Resolution

Serious and/or continual breach of QA procedures will be escalated through the appropriate Deputy Director of Design & Construction. Issues that cannot be resolved will be brought to the attention of the Assistant General Manager of Design & Construction.

7.0 RECORDS

Documents generated by this procedure shall be considered QA records and retained. These include, as a minimum, the following:

- Audit Reports, Schedules, Plans, Questionnaires, Checklists, Audit Observations and Nonconformance Reports.
- Audit notifications.
- Correspondence relating to audit observations, including corrective action documentation, notes of telephone conferences, meeting notes, etc.

AUDIT PLAN

(COVER SHEET)

TITLE:

PLAN NO:

PREPARED BY:

REVISION:

APPROVED BY:

PAGE: 1 of

AUDIT CHECKLIST

AUDIT PLAN NO: REV. CONTRACT NO.		AUDITOR(S)		DATE:
ITEM NO.	ATTRIBUTES/REFERENCE	RESP ORG	OBSERVATIONS <small>NO CHK'D NO. UNSAT</small>	COMMENTS

**SAMPLE
AUDIT QUESTIONNAIRE
DESIGN CONTROL**

ORGANIZATION: Dewberry-Goodkind, Inc.	AUDITOR: Scott L. Semple
PROJECT: Arborway Garage Complex	DATE: March 6, 2002
CONTRACT: R07PS07	AUDIT PLAN: DES03-1

- 1 Did Dewberry-Goodkind have a kick-off meeting with the MBTA to review the scope and the client's expectations after receiving the notice to proceed for phase IV? If so, is there documentation of this meeting?
- 2 Did Dewberry-Goodkind have a design team meeting with all disciplines in attendance after the kick-off meeting? If so, is there documentation of this meeting?
- 3 Has a schedule of follow up meetings been established?
- 4 Is there a project specific Quality Assurance Plan for Dewberry-Goodkind?
- 5 Is there a Project Design Schedule?

AUDIT CHECKLIST CONTINUATION SHEET

ITEM NO.	ATTRIBUTES/REFERENCE	RESP ORG	OBSERVATIONS		COMMENTS
			NO CHK'D	NO. UNSAT	

MBTA AUDIT OBSERVATION

AUDIT NO.

OBS. NO

RESPONSIBLE ORG./AREA

OBSERVATION:

AUDITOR:

DATE:


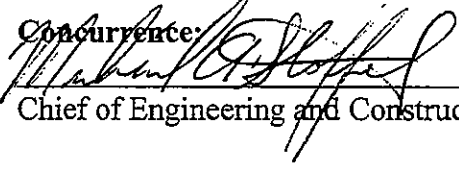
CORRECTIVE/PREVENTIVE ACTION:

SIGNATURE:

DATE:

AUDITOR:

DATE:

QUALITY ASSURANCE PROCEDURE		No.QAP 16.1
TITLE: TRAINING AND CERTIFICATION OF INSPECTORS		Rev. A
		Date: 9/30/03
Approval:  <hr/> Deputy Director of Design & Construction - Quality Assurance		Concurrence:  <hr/> Chief of Engineering and Construction

To establish the training and certification requirements for MBTA Inspectors

2.0 SCOPE

This procedure is applicable to FTA granted projects and those projects selected by MBTA management.

3.0 REFERENCES

- 3.1 FTA Quality Assurance and Quality Control Guideline, Element 15.
- 3.2 MBTA Quality Assurance Program Manual, Section 16 Training.

4.0 ATTACHMENTS

NONE

5.0 GENERAL

- 5.1 Personnel who perform inspections for the MBTA will have the qualifications and experience necessary to perform their tasks. Qualifications will be judged on previous experience and/or training provided by the MBTA.
- 5.2 New hires must receive indoctrination training prior to performing any inspections. This training will include as a minimum the following:
 - MBTA Organizational Structure
 - Contract Specifications
 - Inspector's Duties and Responsibilities, including quantifying contractor payments.
 - Technical Disciplines (Mechanical, Electrical, Piping, Soils, Structural,

NDE, etc.)

5.3 Training will be provided based on the person's job requirements and a demonstrated ability to perform tests and inspections required by the MBTA Standard Specification.

5.4 Certification

5.4.1 Personnel who achieve proficiency in the requirements listed below will receive certification by the Deputy Director of Design & Construction, Quality Assurance. Initial certifications will be based on the Inspector's past job history in the disciplines and their previous training and/or Certifications or licenses from an outside agency. As a minimum the Inspector's must be able to read plans, understand the specification requirements and be able to properly document their inspections. In addition Inspectors must demonstrate an ability to perform inspection and tests within the following major disciplines.

- A. Mechanical
- B. Electrical
- C. Civil
- D. Structural
- E. Piping

5.4.2 Proficiency - Inspectors must maintain proficiency within the disciplines in order to maintain their certifications.. If job requirements prohibit an Inspector from performing inspections and tests within a discipline for a period of one year then retraining will be provided, if appropriate, to refresh the individual in the appropriate discipline. An evaluation will be performed by the Resident Engineers prior to assigning an Inspector to each job. If the Inspector is in need of additional training, the Deputy Director of Design & Construction, Quality Assurance shall be notified. Certifications will remain in effect unless there is reason to question the inspector's ability to perform inspections and tests as required by the specifications or if inspections are repeatedly missed.

5.4.3 Personnel who do not meet the above requirements will be provided the appropriate training to enable them to receive certification.

6.0 PROCEDURE

6.1 As each new inspector is hired the Deputy Director of Design & Construction, Quality Assurance shall be notified to arrange for indoctrination and training.

6.2 The Project Manager/Resident Engineer shall, at the start of each job, review the qualifications of all Inspectors assigned to the job. If any Inspector has not performed all of the discipline inspections as identified in Paragraph 5.4 within

one (1) year, the Project Manager/Resident Engineer shall arrange for the additional training prior to assigning any inspection duties. If at any time during the execution of the job, there is reason to believe that the Inspector may need additional training, the Project Manager/Resident Engineer shall arrange for the training with the DDD&C, Quality Assurance.

6.3 The DDD&C, Quality Assurance shall provide indoctrination and training to Inspectors. Training shall be documented and a copy of all training received by the Inspector retained in the Quality Assurance Department files. If requested, a copy of the training record shall be provided to the Project Manager/Resident Engineer.

6.4 The DDD&C, Quality Assurance shall Certify Inspectors after they have completed all required training.

7.0 RECORDS

Training Records of Individual Inspectors