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**APPLICABILITY FOR
Design and Engineering Design Standards Documents**

Project teams shall refer to their executed project contracts for applicable document versions/revisions.

**SUMMARY OF SIGNIFICANT CHANGES
EP-05 Rev. 5**

- **Added applicability section.**
- **Added acronyms list.**
- **Updated definitions for design staff implementing design services during construction.**
- **Added responsibilities section summarizing the responsibilities of Sound Transit staff and Consultants who are implementing DSDC services.**
- **Added quality section for checking all design changes and associated documentation.**
- **Added review and approval process for changes to post IFC drawings, calculations, and specifications.**
- **Updated substitution requests to align with section 01 25 00 Substitution Procedures.**
- **Exhibits**
 - Removed Exhibit EP-05-01 DSDC Guidelines
 - Removed Exhibit EP-05-03 Changes to the Specifications during Construction
 - Updated and renumbered Exhibit EP-05-02 Design Change Request Process to Exhibit EP-05-01



Approvals:	ENGINEERING DESIGN PROCEDURES	EP- 05 Rev: 5
<hr/> AO Chief Engineer	Design Support During Construction	
<hr/> Director of Technical Standards & Requirements		
	Original Issue Date:	9/5/07
	Current Revision Date:	12/31/24

1.0 PURPOSE

This procedure sets forth the policies, responsibilities, methods, and tools for providing Design Support During Construction (DSDC) to ensure the project is built in accordance with the appropriate design and performance requirements. This procedure also provides a framework for incorporating, evaluating, and approving design changes during construction and requirements and guidance for design staff implementing DSDC services.

2.0 APPLICABILITY

[This EP-05 applies to any project totaling \\$20 million or more.](#)

3.0 SCOPE

This procedure applies to Sound Transit staff and Consultants who are responsible for administering and providing engineering and technical assistance in support of CM staff during construction, testing, start-up, commissioning, and integration phases on Sound Transit projects.

4.0 REFERENCES

- Construction Management Manual
- [Design Criteria Manual/Requirements Manual](#)
- Design Technology Manual
- Quality Management System Plan
- Project Management Plans
- Program Control Policies and Procedures
 - [PCPP-08 Change Orders and Change Notices](#)
 - [PCPP-15 Construction Management Processes](#)
- Safety and Security Certification Plan
- Safety and Security Management Plan

5.0 ACROYNMS

- CM: Construction Manager
- CO: Change Order
- DB: Design Builder
- DBPM: Design-Build Project Management Consultant
- DCM: Design Criteria Manual
- DCR: Design Change Request
- DOR: Designer of Record
- DSDC: Design Support During Construction
- E&O: Errors and Omissions
- GC: General Contractor
- GEC: General Engineering Consultant
- IFC: Issued for Construction
- PCL: Project Control Lead
- PDM: Project Design Manager
- PMSS: Program Management Support Services
- RFD: Request for Deviation
- RFS: Request for Substitution
- STRM: Sound Transit Requirement Manual

6.0 DEFINITIONS

- **Project Design Manager:** Single point of accountability who performs day-to-day coordination between Sound Transit and design team during design development. The assigned design manager could be either a Sound Transit staff or a GEC/DBPM/PMSS consultant staff. Sound Transit staff could be a systems corridor design manager, infrastructure senior design manager or a project manager on the project.
- **Construction Manager:** Construction team representative who oversees key aspects of construction projects, including design changes, substitution requests, design documentation, drawing changes, specifications, quality management, and resolution of deficiencies. CM also play a role in project acceptance, engaging in testing, commissioning, and supporting the transition to operations.

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- **Consultant Design Manager:** Design team single point of accountability who oversees the design development to achieve a quality design which meets requirements and standards.
- **Designer of Record:** Refers to the individual or entity responsible for creating the original design or plans for a construction project. The DOR is often an architect, engineer, or design professional who takes primary responsibility for the project's conceptualization and development.
- **Deficiency:** Plan or specification details or contract administration actions that are incorrect, conflicting, insufficient, or ambiguous or the failure of the plans or specifications, or contract administration actions, to include or provide information that should otherwise be included in the documents.
- **Deviation:** A specific written authorization to deviate from the Sound Transit Design Criteria Manual/ [Requirements Manual](#).
- **Non-Conformance:** A deficiency in characteristic, documentation, or procedure which may affect form, fit, function, maintainability, reliability, or availability, and renders the quality of an item unacceptable or indeterminate.
- **Errors and/or Omissions (E&O):** Failure of the Designer of Record to comply with the standard of care; that is, to perform in accordance with the degree of skill and care ordinarily used by competent practitioners of the same professional discipline under similar circumstances, taking into consideration the contemporary state of the practice and project conditions.
- **As-built Drawings:** They reflect the site's final condition by recording necessary changes and RFIs to the conformed contract drawings with colored markups and referenced Field Sketches.
- **Record Drawings:** They reflect the site's final condition in a final drawing presentation without markups, sketch references, or irrelevant information by drafting/modeling necessary changes to the conformed contract drawings in the supporting electronic data.

7.0 RESPONSIBILITIES

7.1 PROJECT DESIGN MANAGER

The Project Design Manager (PDM) responsibilities includes the following:

- Collaborate with others to identify and provide resources for Design Services During Construction (DSDC). Scope, procure, and manage resources if necessary.
- Evaluate proposed design changes during construction.
- Complete the Design Change Request (DCR) process as outlined in Exhibit EP-05-01 and documenting the decision using the current DCR template available on SharePoint.
- Consider performance requirements, interdisciplinary coordination, construction impacts, third-party approvals, safety, and security.
- Oversee review and making the final determination of Request for Substitution (RFS) by the contractor and ensure compliance with contract requirements.

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- Submit SMR for approval per EP-02 prior to approving the substitution form if proposed RFS is related to a standard specification.
- Maintain design documentation reflective of all issued changes.
- Process all deviations to the Design Criteria Manual/ Requirements Manual as Request for Deviation (RFD), in accordance with the process defined in EP-10.
- Consult with the CM and DOR to determine the level of drawing change is required (e.g., field sketches, red line markups, revised drawings) while concurrently deciding whether revised drawings need to be stamped.
- Identify and review deficiencies and errors of emissions as outlined in Section 9.2.

7.2 CONSULTANT DESIGN MANAGER

The Consultant Design Manger responsibilities includes the following:

- Develop a detailed Submittal List as part of the Final Design to support DSDC services planning, working with PDM to determine the appropriate reviewers for each submittal.
- Provide support for RFIs.
- Offer technical support as required.
- Provide support for testing and commissioning.
- Select the DSDC Lead based on relevant skill sets, including technical expertise, construction experience, and staff management abilities.
- Assigns key design team staff to DSDC responsibilities to ensure project continuity and facilitate coordination with third parties.

7.3 CONSTRUCTION MANAGER

The Construction Manager responsibilities includes the following:

- Participates in the evaluation of design changes, working with the PDM, Designer of Record (DOR), and other team members.
- Ensures adherence to performance requirements, interdisciplinary coordination, and safety considerations.
- Reviews and approves changes impacting operations, seeks third-party approvals when necessary, and addresses safety-critical elements.
- Works with the PDM and DOR to determine necessary updates to design documentation.
- Collaborates on determining the level of drawing changes required, including field sketches, red line markups, or revised drawings.

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- Ensures adherence to Sound Transit's Design Technology Manual and PCPP-15 for managing changes to drawings.
- Classifying each change order and notifying the PDM if a change order is result of a "Deficiency".
- Works with the PDM and DSDC team to resolve deficiency-related issues efficiently.

7.4 DESIGNER OF RECORD

The Designer of Record responsibilities includes the following:

- Collaborate with the Project Design Manager (PDM) and Construction Manager (CM) in evaluating proposed design changes during construction.
- Participate in the review and approval process for design changes impacting safety-critical elements.
- Collaborate with the PDM to determine necessary updates to design documentation resulting from changes.
- Collaborate with the PDM and CM to determine the level of drawing changes required.
- Independently review clarifications, field sketches and other minor design changes.
- Assist the PDM and make recommendation regarding the need to stamp revised drawings.
- Address deficiencies identified by the CM team, collaborating with the PDM and DSDC team for resolution.
- Participate in the review and documentation of change orders classified as "Deficiencies."
- Collaborate with the PDM on determining if a deficiency may be an Errors or Omissions (E&O), involving appropriate Sound Transit personnel.

8.0 QUALITY

- Ensure that responses to Requests for Information (RFIs) are in conformance with contract documents. Collaborate with the Construction Manager (CM) to enforce proper contractor use of RFIs. RFIs should not be used as substitutes for Requests for Change (RFCs) for contractor-initiated changes or for Non-Conformance Reports (NCRs) in the case of required repairs.
- All design changes must be accompanied by change packages that are reviewed in accordance with the DOR Design Quality Program.
- The Request for Deviation (RFD) process requires sign-off from the agency.
- All design changes and associated documentation shall be checked in accordance with project Quality Management Plan.

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- For DBB and GCCM projects:
 - a. Collect feedback from the CM team regarding elements of the plans or specifications that may require rework for future projects, based on encountered conditions and any changes or claims.
 - b. Identify and clarify items of work that were excluded from the final designer's scope, including those provided by the owner or other parties.
 - c. Establish an escalation process for issues with key third parties to ensure that DSDC and construction phase issues are resolved promptly.

9.0 PROCEDURES

The Sound Transit [Project Design Manager \(PDM\)](#), in collaboration with others, will identify and provide the required resources for DSDC services. The Consultant and Sound Transit staff roles and responsibilities for providing DSDC services are defined in this procedure. Project specific organization charts, that include the DSDC services support staff, will be developed for each major construction contract and be included in the Project Management Plan.

9.1 DESIGN CHANGE MANAGEMENT

A. Post IFC Changes

- Post IFC changes to drawings, calculations, and specifications made by the DOR must be submitted to the PDM and distributed to stakeholders for review and approval. The PDM, in collaboration with the DOR and CM, will determine the appropriate team members and stakeholders to evaluate the changes. All comments must be resolved before the changes are included in construction or installation.
- For revisions to Sound Transit Standard Specifications, see Engineering Procedure Specification Development and Maintenance (EP-02).
- All deviations to the DCM/ Requirements Manual shall be processed as a Request for Deviation (RFD), in accordance with the process defined in EP-10.

B. Design Change Request

- A design change request is any change initiated during construction by Sound Transit staff not part of the project. The PDM is responsible for coordinating completion of the Design Change Request (DCR) process as outlined in [Exhibit EP-05-01](#) and document the decision using the current Design Change Request template found on SharePoint in the Configuration site: [ST DCR Form](#). All proposed design changes shall be evaluated on the following:
 1. Meeting performance requirements, including adherence to Sound Transit Design Criteria/ [Requirements Manual](#).

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2. Interdisciplinary coordination, including Safety, Operations and Environmental; Interdisciplinary coordination is of critical importance to avoid impacting other elements of work.
3. Construction, design, and operational impacts. Changes that impact operations **must** be reviewed and approved by the **operations single point of contact assigned to the project**.
4. Secure review and approval from Third Parties when required.
5. Changes that impact a safety critical element must be reviewed by the CM, **PDM**, DOR, and Safety Specialist. The project safety and security documentation shall be updated if necessary.

C. Substitution Requests

- **DSDC is responsible for reviewing and approving all substitution requests from contractors in accordance with section 01 25 00 - Substitution Procedures.**

D. Design Change Documentation

- The **DOR**, in consultation with the **PDM**, will determine what design documentation needs to be updated as a result of the change. All necessary documentation shall be provided in accordance with the DCM/ **Requirements Manual** and Engineering Procedures.
- The **DOR**, in consultation with the CM and **PDM**, will determine what **type** of drawing change is required; e.g. field sketch, red line markups, or revised drawings.
- The **DOR**, in consultation with the **PDM**, will make the determination regarding the need to stamp revised **IFC** drawings.
- Changes to the drawings must be managed in accordance with Sound Transit's Design Technology Manual.
- Field sketches will be managed in accordance with Sound Transit's PCPP-15.
- The Contractor, with the oversight of the CM team, is responsible for keeping the as-built drawings up to date as defined in the Contract. The DSDC will be responsible for completing the final record drawings **unless otherwise directed by Sound Transit**.

9.2 REVIEW OF DEFICIENCIES AND ERRORS OR OMISSIONS (E&O)

- The CM team is responsible for classifying each change order and notifying the **PDM** if a change order is the result of a "Deficiency". The CM team role and classification of change orders is covered in more detail in the Construction Manual and PCPP-08 Change Notices and Change Orders.

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- The **PDM** is responsible for notifying the Designer of Record (DOR) that a deficiency was identified and working with the CM team and DSDC team to ensure the change issue is resolved expeditiously.
- The **PDM** is responsible for reviewing all change orders classified as “Deficiencies” to determine if a deficiency exists and documenting their findings. The **PDM** will consult with the DOR and provide the opportunity for input or rebuttal. The DOR’s response must be reflected in the documentation.
- The **PDM** is responsible for keeping a log documenting their review and findings. An example deficiency log is provided in Exhibit EP-05-03. The **PDM must** notify the CM and the Project Control Lead of their final determination so they can update the Change Order documentation. (This step may occur after the change order has been processed with the **GC/DB**.)
- Should the **PDM** determine that a deficiency may be the result of an E&O, the **PDM must** consult with the appropriate Sound Transit Engineering Director and ST Legal staff. The ultimate determination of an E&O is made by ST Legal. The **PDM** is responsible for completing a memo to document each E&O to be signed off by the appropriate Engineering Director and ST Legal staff. (An example memo is included in Exhibit EP-05-02). The **PDM** will share the signed E&O memo with the CM and PCL so it can be added to the change order file.

9.3 PROJECT ACCEPTANCE

DSDC staff will assist with project acceptance at completion of construction **per their Contract**. DSDC staff assistance **typically** involves **but is not limited to**:

- Participation in testing and commissioning activities as needed.
- Technical reviews and close-out of non-conformance issues.
- Support of the CM in final inspections and developing project punch lists.
- Participation in the review and verification of accuracy and completeness of contractor furnished As-Built mark-ups and complete Final Record Drawings.
- Complete Letter of Conformances as required by local codes.
- Support the CM team in review and close-out of safety and security certifiable items list.
- Support the CM team with transition to operations items.

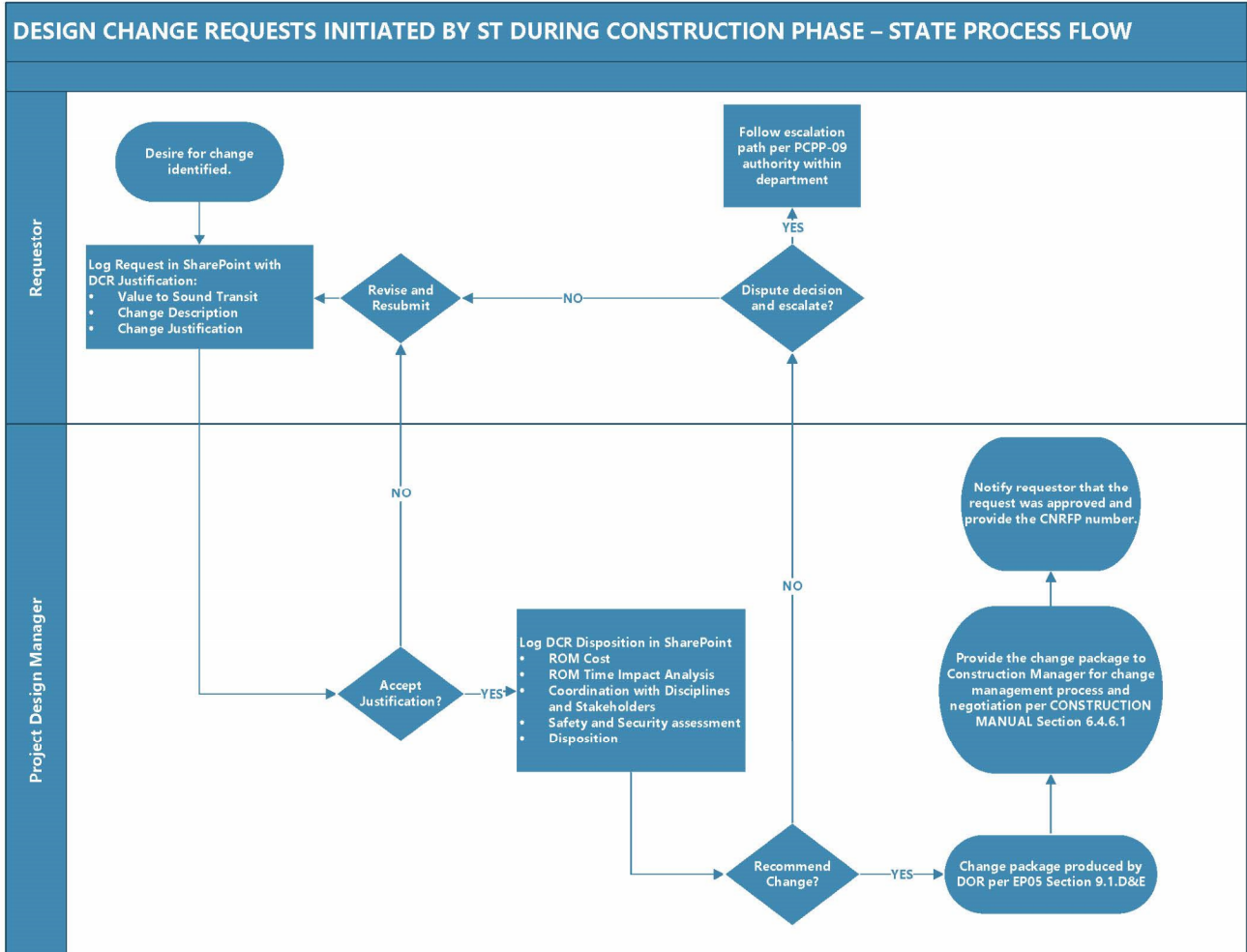
10.0 EXHIBITS

EP-05-01 Design Change Request Process

EP-05-02 Example E&O Memo

EP-05-03 Example Deficiency Log

EP-05-01 DESIGN CHANGE REQUEST PROCESS



EP-05-02 EXAMPLE E&O MEMO



TO: E335 Change Order #TBD File
DATE: July 3, 2019
FROM: Kerry Pihlstrom, Director Civil and Structural Engineering
CC: James Richards, E335 Resident Engineer

SUBJECT: E335 Downtown Bellevue to Spring District
 Contract No.: RTA/CN 0045-14C
 RFC 256 E19 Conflicting Light Pole Requirements– Errors & Omissions Designation Justification

Change Order Description and Concurrence

Location: Station E19 (Wilburton Station). Response to Request for Information (RFI) 01748 dated May 14, 2019, changed the height and size of the poles for the exterior lighting fixtures LP and LP3.

I have reviewed this Change Order and concur with the decision to designate this Change Order as "E & O" – due to errors or omissions in the design plans.

Explanation / Justification for Errors & Omissions Designation

Request for Change (RFC) 256 provided by the contractor notified Sound Transit of costs associated with the Response to RFI 01748. The costs resulted in conflicting errors in the contract documents. The Fixture Schedule on Drawing E19-ELS850 calls for 15' x 6 inch square pole for both the fixtures Types LP and LP3. But the part number for poles for Type LP (PSA12-4125-SA-4") refers to a 12' x 4" square pole and Type LP3 (PSA15'-4188-SB-4") refers to 15' 4" square pole. Drawing E19-ELD900 which provides details of the lighting poles show a 14' 4 inch square pole. The contractor noted that the bid was based on 14' 4 inch square pole. The response to RFI 01748 clarified that the size of the pole for the LP and LP3 fixtures should be 15' high, 6 inch square pole. There are costs for changing 16 poles from 14' 4 inch square to 15'- 6 inch square poles.

This error was discovered after the Total Contract Cost (TCC) was negotiated; therefore the added construction costs related to the above changes were not included in the TCC. If the error had been corrected during pre-construction, the TCC would have included costs for the labor and materials necessary to complete the revision.

It is noted that the revised Contract documents associated with this Change Order were amended and updated by the designer at no additional charge or expense to Sound Transit, as mandated by Contract.

Concurrence

The undersigned hereby concur with the above-described designation of this Change Order as due to errors or omissions in the design plans and specifications, and to the justification provided above:

<u>Director of Civil and Structural Engineering</u>	Kerry Pihlstrom	Date
<u>Construction Manager:</u>	Jon Lebo	Date
<u>Legal Counsel:</u>	Jim Niemer	Date

EP-05-03 EXAMPLE DEFICIENCY LOG

Example Deficiency Log										As of 11/22/2019		CDM Review and Documentation				
TITLE	STATUS	RFI	Delay	RFC	WD	CO	CLAIM	Change Order Cost	JUST CODE	Status/Remarks	BIC	Reviewed By	Date Reviewed	Final Disposition	CDM Comments	DOR Comments
E15 Windscreen Embeds	CLOSED	01084		152		TBD		\$ 65,000	EO	Completed		John Doe	5/14/2019	EO	An E&O memo was processed and signed by the director of engineering and ST Legal on 5/14.	
E19 Conflicting Light Pole Requirements	OPEN	01748		256		122		\$ 15,894	DE	Under review		John Doe		EO		
E19 HTCC Connection to the BMS	OPEN	01531		208	103	124		\$ 8,900	DE	Under review		John Doe		EO		
E19 Below Grade MEP Sleeves	OPEN	01715		244		139		\$ 4,500	DE	Completed		John Doe	12/2/2019	DE	reviewed this change and believe it was a result of a deficiency due to the DOR. Based on my review I don't believe it rises to a level of an Error or Omission. Sound Transit was not charged by the DOR to correct this error.	
E15 Rainleaders through Abutment Walls	OPEN	00013, 01228		164		139		\$ 7,193	DE	08/21 - E&O Memo sent to Ryan McKelvy for review		John Doe		DE		
E19 Platform Trench Drains to Rainleader System	CLOSED	01342, 01211, 01513		193		113		\$ 8,000	EO	07/29 - E&O Memo Signed		John Doe			An E&O memo was processed and signed by the director of engineering and ST Legal on 7/29.	
Notes:																
DE=Deficiency																
AA=Agency Action																
EO=Error or Omission																
DSC=Differing Site Conditions																
VE=Value Engineering																
CA=Contractor Action																
* Refer to PCPP-08 for more information on change categories																