2024

TECHNICAL ASSISTANCE PROGRAM

CORPORATE WEBINAR

HENSEL PHELPS
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SUPPLIER DIVERSITY

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PROJECT QUALITY CONTROL

MODERATED BY

Jason Jones

Manager of Supplier Diversity

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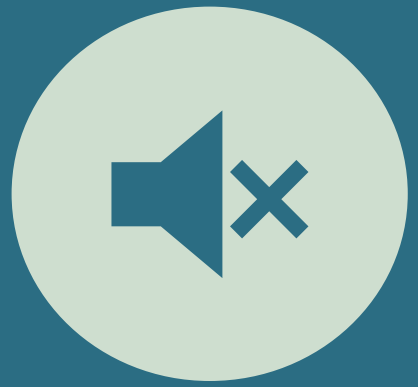
HOUSEKEEPING



MUTE

PLEASE **MUTE** YOUR LINE THROUGHOUT THE PRESENTATION

CAMERA

WE ENCOURAGE YOU TO HAVE YOUR CAMERA **ON**.

QUESTIONS

HAVE A QUESTION? ASK IN THE **CHAT.**

WE WILL HAVE A Q&A SECTION AT THE END OF THE PRESENTATION

REACT

REACT! STAY ENGAGED WITH REACTIONS

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PROJECT QUALITY CONTROL

PRESENTED BY

William "Bill" Scott

Senior QC Manager

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DEFINING QUALITY CONTROL

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DEFINITION

Quality control refers to a company's methods for assessing product quality and, if necessary, improving it.

What are some of the goals of Quality Control on Hensel Phelps Projects?

- Eliminating re-work
- Maintain a project workflow by efficiently coordinating and sequencing trades in a safe manner while creating an atmosphere of cooperation on the jobsite.
- Exceed our clients' quality expectations.

DEFINING QUALITY CONTROL

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- Quality - The standard of something as measured against other things of a similar kind; the degree of excellence of something
- Control - The power to influence or direct people's behavior or the course of events
- Quality Control – The activity of checking goods as they are produced to make sure that the final products are good

KEY ASPECTS TO QUALITY CONTROL

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- Understanding what is purchased.
- Making sure QC administrative procedures are taken care of:
  - Submittals (submitted on time to support the project schedule)
  - RFIs (proactively/accurately written to limit project delays)
  - Document approvals (drawings/specs)
  - Specification Review
  - Inspection Requests (understand IR submission timelines, tracked to completion to ensure jurisdictional acceptance of installed work.)
- Work is installed correctly/safely
- All work is completed.

FUNDAMENTALS OF SUCCESSFUL PROJECTS

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- All Four Are Critical to Success
- None Are Less Important Than Others
- Problems With One Will Affect the Others

BUILDING A QC PLAN

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Does your team have an internal QC plan specific to your scope?

If so, does your plan contain the following information:

- Who is on your team – Will your foreman act as QC/Safety for the project?
- Make the plan project specific
- Testing & Inspections
- Understanding your role in the Commissioning Process
- Documentation: Checklists or other supporting documentation
- Communication: Know key players and communication to and from HP/Owner

If your company does not have an internal QC plan refer to the JIP Brochure (Job Information Policy). This will be included with your contract.

INTEGRATING QUALITY CONTROL

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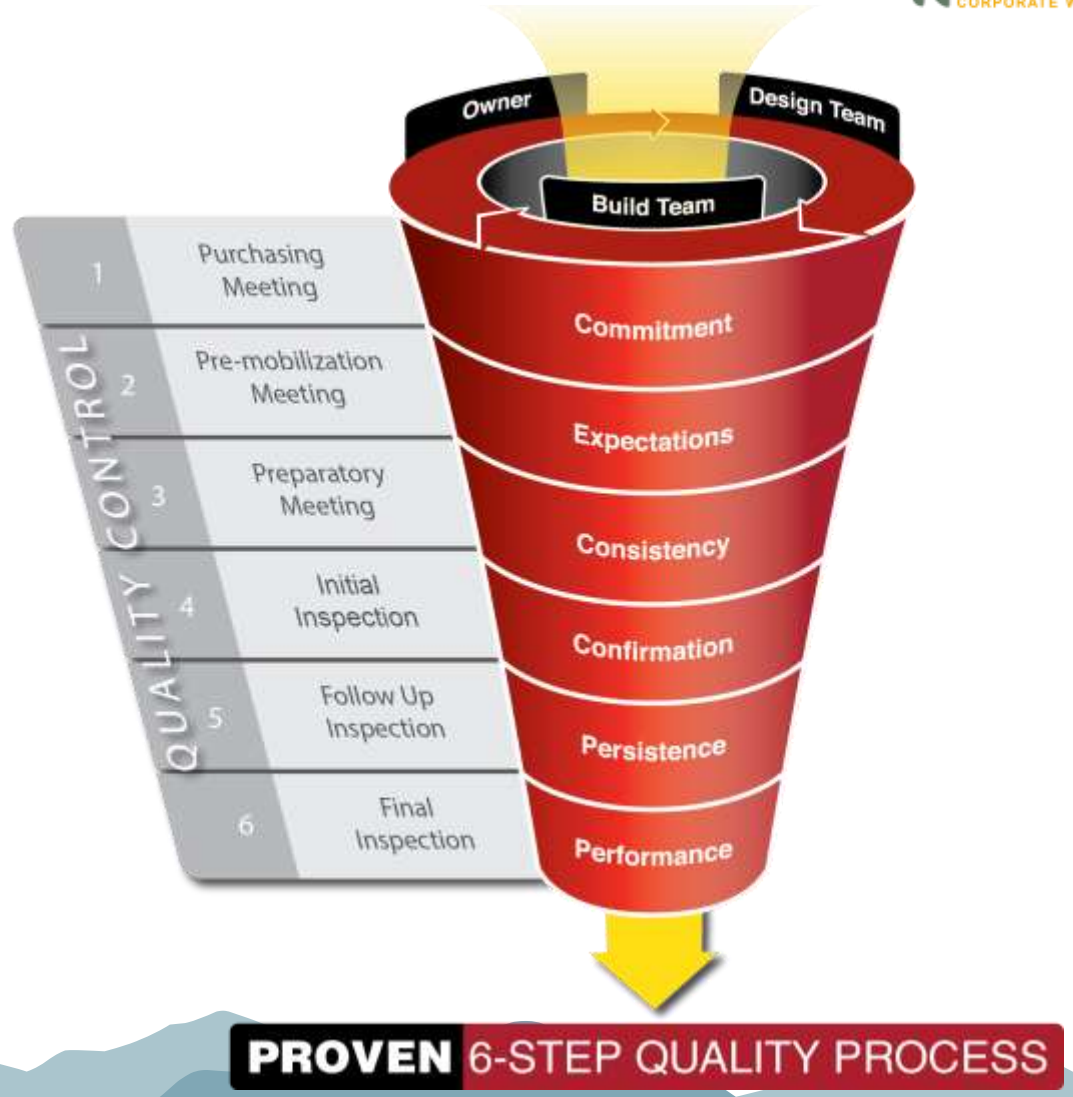
- Quality Control Activities
- Safety Activities
- Other Team Involvement
- Trade Partner Involvement



INTRODUCTION TO HENSEL PHELPS'S SIX STEP QUALITY PROCESS (QC 201)

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Step 1 – Purchasing Meeting

Step 2 – Pre-Mobilization Meeting

Step 3 – Preparatory Meeting

Step 4 – Initial Inspection

Step 5 – Follow Up Inspection

Step 6 – Final Inspection

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SIX STEP QUALITY CONTROL PROCESS FLOW CHART

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Activities by Process Step	Quality Control Activities	Safety Activities	Overall Hensel Phelps and Project Team Involvement
Step 2. Pre-Mobilization Meeting (as soon as possible after issuance of subcontract to support the Project Schedule)			
► Review the 6 Step Quality Control/Safety Process ► Obtain commitments for all Preparatory Meeting prerequisites ► Develop plan for mockup construction as required ► Develop the DFOW breakdown for Preparatory Meetings with a tentative schedule ► Define project administrative requirements ► Obtain commitments to dates for the scope of submittals and schedule input requested ► Review 90-day preliminary schedule ► Review JIP brochure highlights ► Review Trade Partner Startup Risk Assessment Questionnaire	► Review Site-Specific Quality Control Plan and requirements of the 6 Step Process ► Define general expectations/preparation for Preparatory Meetings ► Define inspection process ► Initiate development of Project-Specific DFOW Checklists ► Review Master Test Register and define testing procedures and responsibilities – on/off site ► Obtain commitments to Source and Special Inspections process ► Update QPL listing of all DFOWs with Trade Partner ► Define commissioning needs and implementation requirements (if applicable)	► Review Site-Specific Accident Prevention Plan ► Review AHA requirements/expectations/ schedule with DFOW list ► Highlight safety requirements per applicable standards (OSHA 1926/EM 385/other) ► Jobsite employee orientations ► SAFE participation and accountability ► Commitment to the "Zero Accident Culture" ► Commitment to the Disciplinary Action Plan ► Acquire Trade Partner safety submittals ► Obtain commitment to participate in Jobsite Safety Committee and Inspection's ► Review Accident Investigation procedure and the Trade Partner's role	► HP Project Manager (P) ► HP Superintendent (P) ► HP Area Superintendent (O) ► HP Project Engineer (R) (L) ► HP Office Engineer (P) (SU) ► HP Quality Control (P) ► HP Safety (P) ► Trade Partner Principal (R) ► Trade Partner Project Manager (R) ► Trade Partner Superintendent (P) ► 2nd Tier/Sub-tier Trade Partners (P)*
Step 3. Preparatory Meetings (1-2 weeks prior to start of DFOW)			
► Confirm prerequisites are complete prior to scheduling Preparatory Meeting ► Review Pre-Mobilization action items with jobsite supervision ► Review quality and safety expectations ► Define scope, location and parameters of Initial Inspection ► Review interfaces and define coordination responsibilities with all trades ► Finalize testing expectations, requirements, and responsibilities ► Review current schedule needs for quality, safety and production ► Mockup constructed and approved (if required) ► Review CPM, 90-day detailed schedule and 4-week schedules (acquire additional input as needed) ► Determine productivity rates for production trending	► Review "means and methods" in detail to achieve the desired quality ► Concentrate on high risk and "difficult details" of the DFOW ► Review outcome of any Special or Source Inspections completed ► Provide adequate planning time to conduct an effective Preparatory Meeting ► Review and finalize inspection requirements ► Review and finalize testing requirements ► Clearly define QC responsibilities and procedures ► Finalize project-specific DFOW QC Checklists ► Update QPL ► Define procedure and importance of daily documentation ► Integrate commissioning requirements (if applicable) ► Define deficiency process and allowable time to correct ► Identify if any substrates are critical for follow-on work	► Clearly define roles/responsibilities/ expectations of Site-Specific Accident Prevention Plan ► Review the accepted AHA, focus on high risk areas ► Define Competent, Qualified, and Certified personnel per DFOW ► Schedule Foreman's Indoctrination ► Review qualifications/training expectations ► Acquire employee qualifications and training documentation ► Obtain commitment to participate in SAFE ► Review permit expectations and other specific plans associated with this DFOW (e.g., cranes, Subpart R, confined space). All plans must be accepted prior to Preparatory Meeting ► Confirm all employees will attend orientation prior to start of work ► Determine if this work represents a hazard to other Trade Partner employees	► HP Project Manager (O) ► HP Project Superintendent (P) ► HP Area Superintendent (R) (L) ► HP Project Engineer (O) ► HP Office Engineer (P) (SU) ► HP Field Engineer (P) (SU) ► HP Quality Control (R) (SU) ► HP Safety (P) (SU) ► Trade Partner Project Manager (P) ► Trade Partner Superintendent (P) ► Trade Partner Foreman (R) ► Trade Partner Quality Control (P) ► Trade Partner Safety (P) ► 2nd Tier/Sub-tier Trade Partners (P)* ► Owner's Representative (P)* ► Third Party Testing Agency (P)* ► Commissioning Agent (P)* ► Municipal Authorities (O) ► Regulatory Agency (O)

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START OF FIELD ACTIVITIES

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Start of Field Activities - Material Inspections

- Done prior to material being loaded into the building.
- Done with the foreman/quality representative, Hensel Phelps and the owner's representative.
- Items checked against the approved submittals.
- Done at intervals to limit risk.
- Expiration/shelf-life dates verified.
- Understanding, storage environment, and temperatures is a must.

CHECKLISTS

What is included when building a checklist?

- Collaboration
- Codes and Standards
- Materials Installation Req.
- Project Specific Requirements
- Past Experience
- Inspection requirements.

COMPLETED CHECKLISTS

What is included?

- Action Items
  - Description of work – compliant and non-compliant items.
  - Due dates for completion of noncomplying items.
- Photos
  - Conforming and non-conforming items.
  - Non-conforming items
- Signatures

When are checklists used:

Initial and Follow-Up Inspections (Internal QC Process - Not Jurisdictional Inspection)

TEST AND INSPECTION PROCESS

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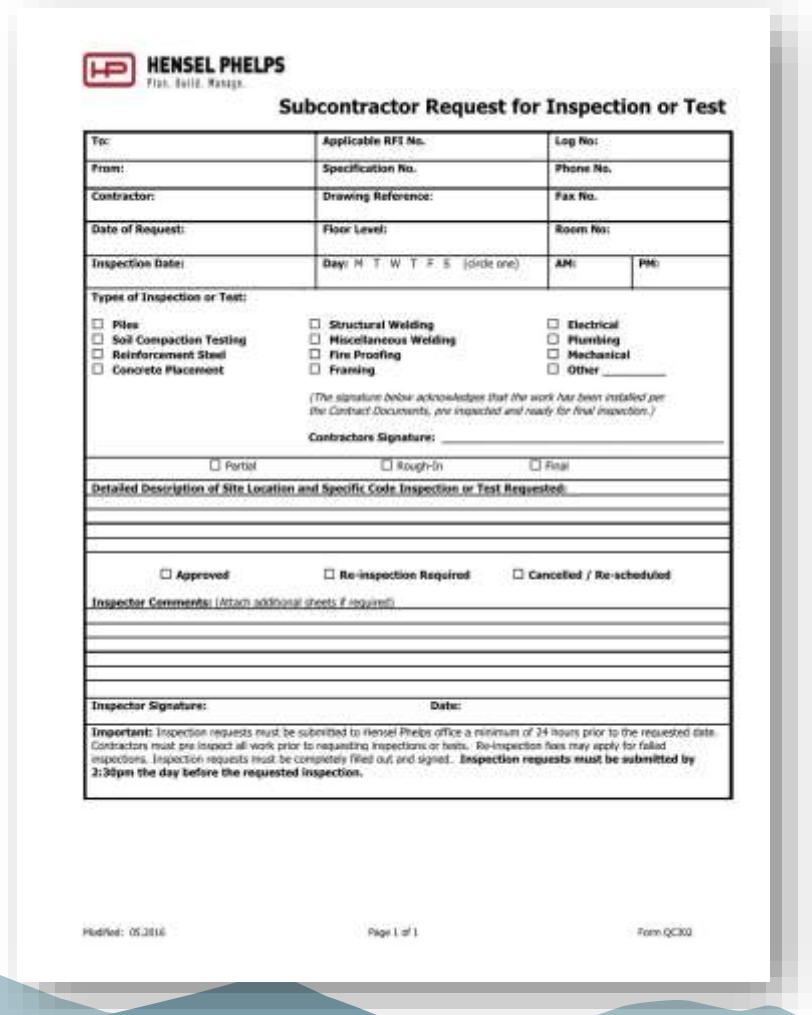
- Pre-Testing and Inspecting
- Scheduling Tests and Inspections
  - Self-Performed Tests
  - Third Party Testing
  - Group Inspections
- Witnesses
- Documenting Tests and Inspections



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Subcontractor Request for Inspection or Test

To:	Applicable RFI No.	Log No:	
From:	Specification No.	Phone No.	
Contractor:	Drawing Reference:	Fax No.	
Date of Request:	Floor Level:	Room No:	
Inspection Date:	Day: M T W T F S (circle one)	AM:	PM:

Types of Inspection or Test:

☐ Piles	☐ Structural Welding	☐ Electrical
☐ Soil Compaction Testing	☐ Miscellaneous Welding	☐ Plumbing
☐ Reinforcement Steel	☐ Fire Proofing	☐ Mechanical
☐ Concrete Placement	☐ Framing	☐ Other _____

(The signature below acknowledges that the work has been installed per the Contract Documents, are inspected and ready for final inspection.)

Contractors Signature: _____

☐ Partial ☐ Rough-In ☐ Final

Detailed Description of Site Location and Specific Code Inspection or Test Requested:

☐ Approved ☐ Re-inspection Required ☐ Cancelled / Re-scheduled

Inspector Comments: (Attach additional sheets if required)

Inspector Signature: Date:

Important: Inspection requests must be submitted to Hensel Phelps office a minimum of 24 hours prior to the requested date. Contractors must pre inspect all work prior to requesting inspections or tests. Re-inspection fees may apply for failed inspections. Inspection requests must be completely filled out and signed. **Inspection requests must be submitted by 2:30pm the day before the requested inspection.**

Modified: 05.2016 Page 1 of 1 Form QC302

TEST AND INSPECTION PROCESS

Inspection Examples

- Concrete Pour Card Form
- Concrete Placement Card
- Subcontractor Request for Inspection
- Wall Close-In Inspection
- Ceiling Close-In Inspection
- Raised Floor Close-In Inspection
- Backfill Inspection Checklist

INITIAL AND FOLLOW UP INSPECTIONS

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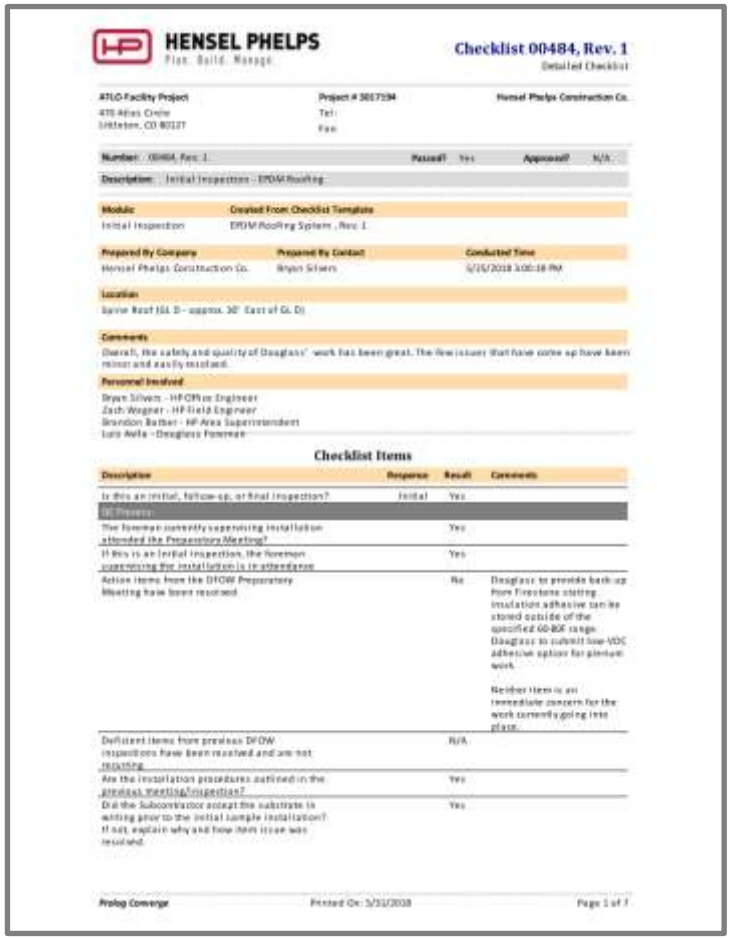

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Checklist 00484, Rev. 1
Detailed Checklist

ATLO Facility Project
470 Atlas Circle
Littleton, CO 80127

Project # 3017194
Tel:
Fax:

Hensel Phelps Construction Co.

Number: 00484, Rev. 1 — Passed? Yes — Approved? N/A

Description: Initial Inspection - EPDM Roofing

Module	Created From Checklist Template
Initial Inspection	EPDM Roofing System , Rev. 1

Prepared By Company	Prepared By Contact	Conducted Time
Hensel Phelps Construction Co.	Bryan Silvers	1/31/2018 3:00:18 PM

Location
Spine Roof (Gl. D - approx. 30' East of Gl. D)

Comments
Overall, the safety and quality of Douglass' work has been great. The few issues that have come up have been minor and easily resolved.

Personnel Involved
Bryan Silvers - HP Officer Engineer
Zach Wagner - HP Field Engineer
Brandon Barber - HP Area Superintendent
Luis Avila - Douglass Foreman

Checklist Items

Description	Response	Result	Comments
Is this an initial, follow-up, or final inspection?	Initial	Yes	
QC Process:			
The foreman currently supervising installation attended the Preparatory Meeting?		Yes	
If this is an initial inspection, the foreman supervising the installation is in attendance		Yes	
Action items from the DFOW Preparatory Meeting have been resolved.		No	Douglass to provide back up from Firestone stating insulation adhesive can be stored outside of the specified 60-80F range. Douglass to submit low-VOC adhesive option for plenum work. Neither item is an immediate concern for the work currently going into place.
Deficient items from previous DFOW inspections have been resolved and are not recurring		N/A	
Are the installation procedures outlined in the previous meeting/inspection?		Yes	
Did the Subcontractor accept the substrate in writing prior to the initial sample installation? If not, explain why and how item issue was resolved.		Yes	

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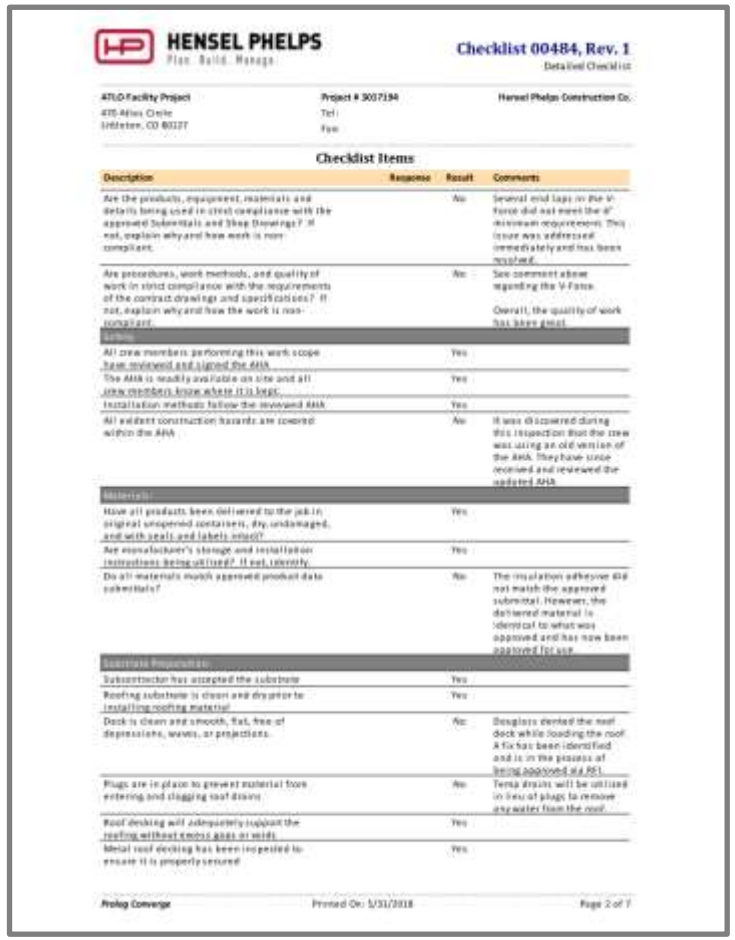

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Checklist 00484, Rev. 1
Detailed Checklist

ATLO Facility Project
470 Atlas Circle
Littleton, CO 80127

Project # 3017194
Tel:
Fax:

Hensel Phelps Construction Co.

Checklist Items

Description	Response	Result	Comments
Are the products, equipment, materials and details being used in strict compliance with the approved Submittals and Shop Drawings? If not, explain why and how work is non-compliant.		No	Several mid laps in the V-Force did not meet the 6" minimum requirement. This issue was addressed immediately and has been resolved.
Are procedures, work methods, and quality of work in strict compliance with the requirements of the contract drawings and specifications? If not, explain why and how the work is non-compliant.		No	See comment above regarding the V-Force. Overall, the quality of work has been great.
Safety:			
All crew members performing this work scope have reviewed and signed the AHA		Yes	
The AHA is readily available on site and all crew members know where it is kept.		Yes	
Installation methods follow the reviewed AHA		Yes	
All evident construction hazards are covered within the AHA		No	It was discovered during this inspection that the crew was using an old version of the AHA. They have since received and reviewed the updated AHA
Materials:			
Have all products been delivered to the job in original unopened containers, dry, undamaged, and with seals and labels intact?		Yes	
Are manufacturer's storage and installation instructions being utilized? If not, identify.		Yes	
Do all materials match approved product data submittals?		No	The insulation adhesive did not match the approved submittal. However, the delivered material is identical to what was approved and has now been approved for use.
Substrate Preparation:			
Subcontractor has accepted the substrate		Yes	
Roofing substrate is clean and dry prior to installing roofing material		Yes	
Deck is clean and smooth, flat, free of depressions, waves, or projections.		No	Douglass dented the roof deck while loading the roof. A fix has been identified and is in the process of being approved via RFI.
Plugs are in place to prevent material from entering and clogging roof drains		No	Tema drains will be utilized in lieu of plugs to remove any water from the roof.
Roof decking will adequately support the roofing without excess gaps or voids		Yes	
Metal roof decking has been inspected to ensure it is properly secured		Yes	

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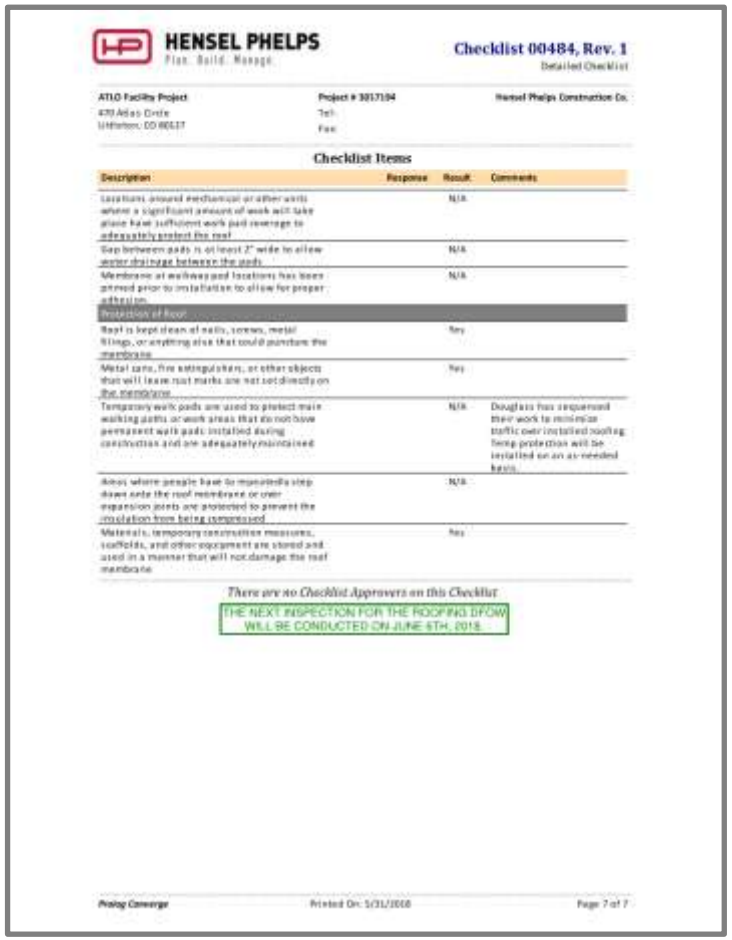

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Checklist 00484, Rev. 1
Detailed Checklist

ATLO Facility Project
470 Atlas Circle
Littleton, CO 80127

Project # 3017194
Tel:
Fax:

Hensel Phelps Construction Co.

Checklist Items

Description	Response	Result	Comments
Locations around mechanical or other units where a significant amount of work will take place have sufficient work pad coverage to adequately protect the roof.		N/A	
Gap between pads is at least 2" wide to allow water drainage between the pads.		N/A	
Membrane at walkway pad locations has been primed prior to installation to allow for proper adhesion.		N/A	
Protection of Roof:			
Roof is kept clean of nails, screws, metal filings, or anything else that could puncture the membrane.		Yes	
Metal cans, fire extinguishers, or other objects that will leave rust marks are not set directly on the membrane.		Yes	
Temporary walk pads are used to protect main walking paths or work areas that do not have permanent walk pads installed during construction and are adequately maintained.		N/A	Douglass has requested their work to minimize traffic over installed roofing. Temp protection will be installed on an as-needed basis.
Areas where people have to repeatedly step down onto the roof membrane or over expansion joints are protected to prevent the insulation from being compressed.		N/A	
Materials, temporary construction measures, scaffolds, and other equipment are stored and used in a manner that will not damage the roof membrane.		Yes	

There are no Checklist Approvers on this Checklist

THE NEXT INSPECTION FOR THE ROOFING DFOW WILL BE CONDUCTED ON JUNE 6TH, 2018.

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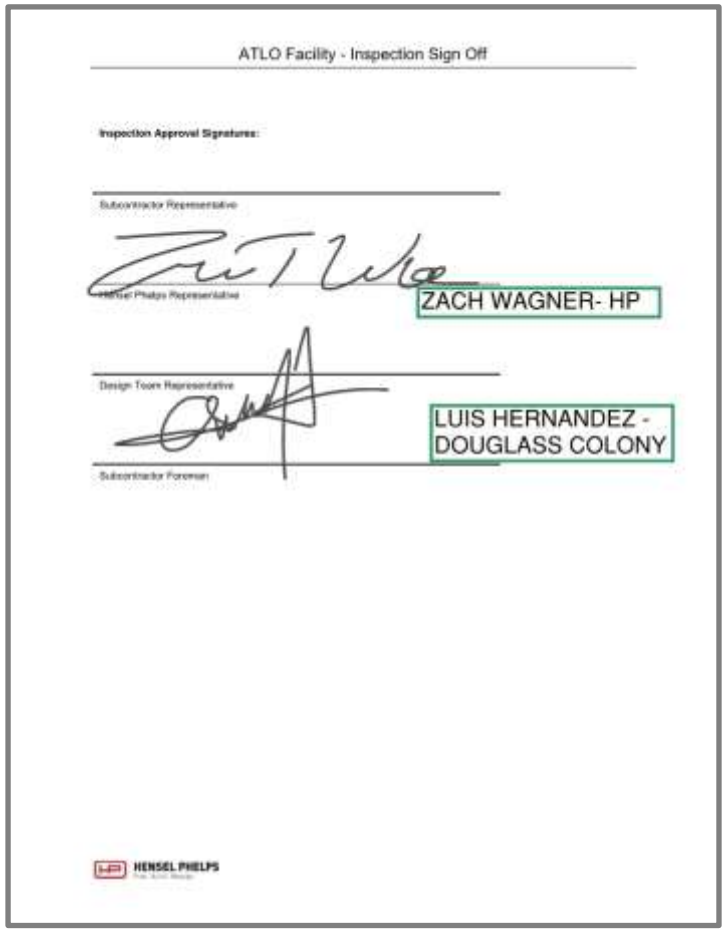

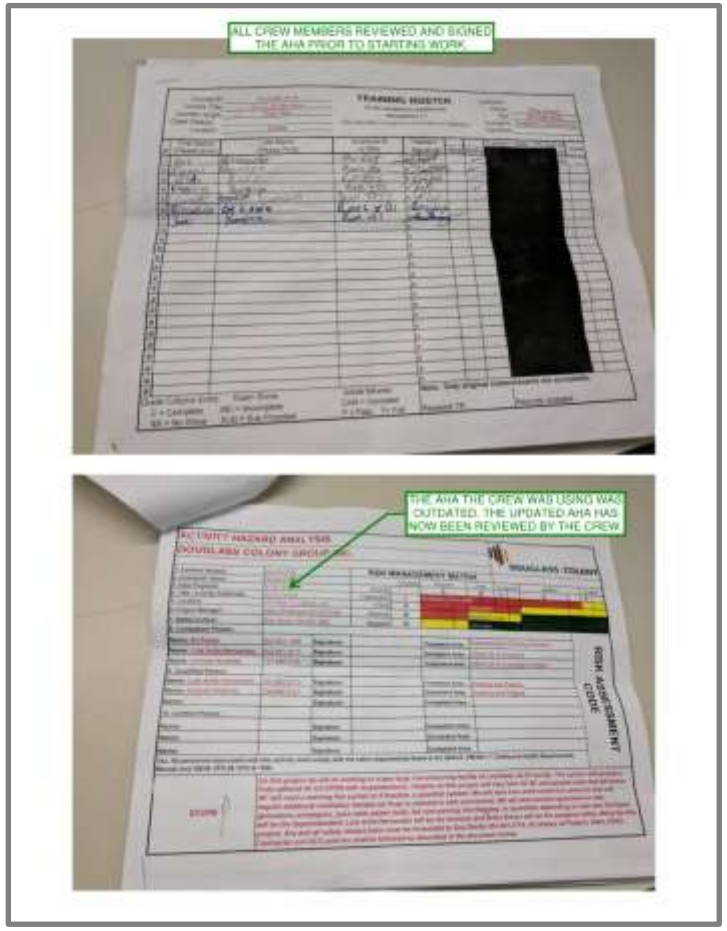

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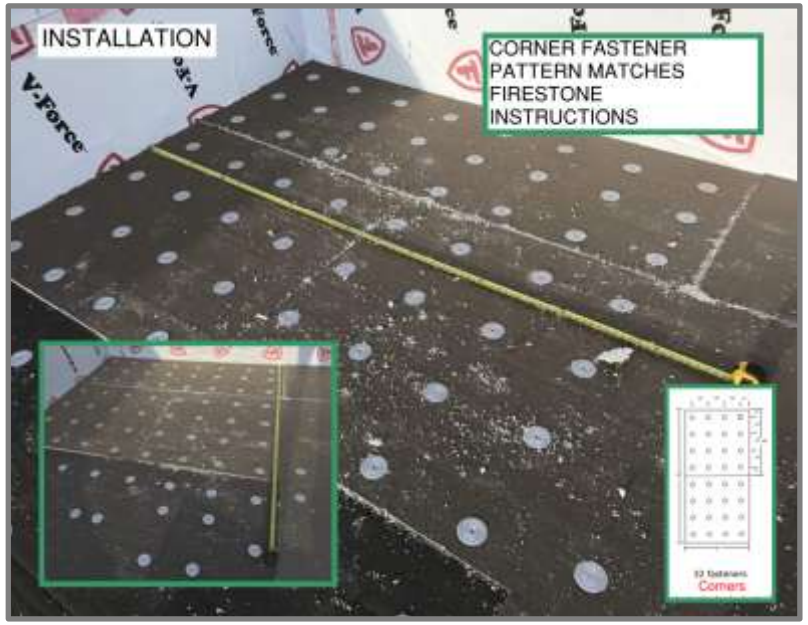

HENSEL PHELPS QC PROCESS TOOLS

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Quality Control Plan

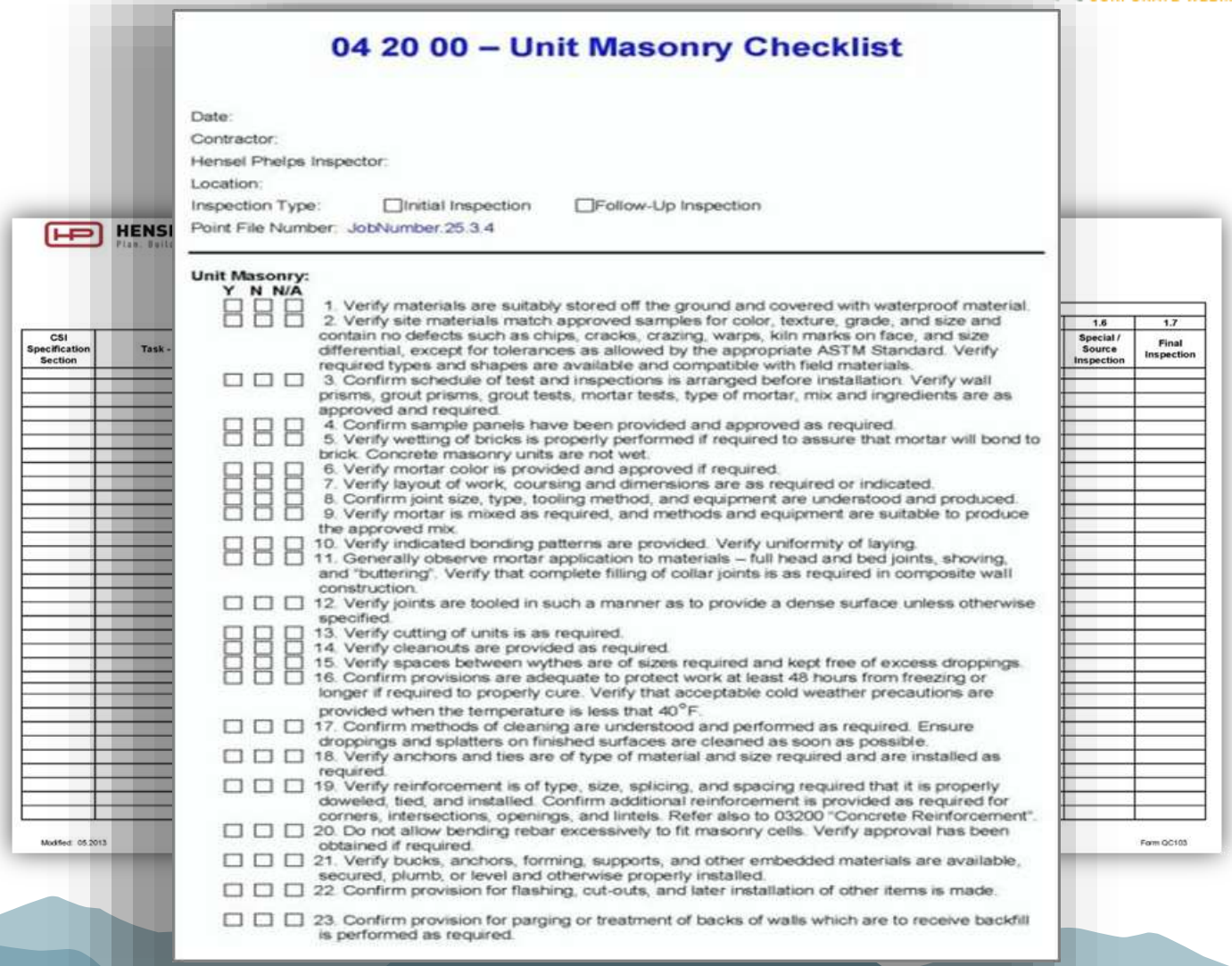
Detailed Explanation

Quality Process Log

Communications Tools

Checklists

Enhance trade partner awareness and expectations



04 20 00 – Unit Masonry Checklist

Date:
Contractor:
Hensel Phelps Inspector:
Location:
Inspection Type: ☐Initial Inspection ☐Follow-Up Inspection
Point File Number: JobNumber.25.3.4

Unit Masonry:

Y	N	N/A	
☐	☐	☐	1. Verify materials are suitably stored off the ground and covered with waterproof material.
☐	☐	☐	2. Verify site materials match approved samples for color, texture, grade, and size and contain no defects such as chips, cracks, crazing, warps, kiln marks on face, and size differential, except for tolerances as allowed by the appropriate ASTM Standard. Verify required types and shapes are available and compatible with field materials.
☐	☐	☐	3. Confirm schedule of test and inspections is arranged before installation. Verify wall prisms, grout prisms, grout tests, mortar tests, type of mortar, mix and ingredients are as approved and required.
☐	☐	☐	4. Confirm sample panels have been provided and approved as required.
☐	☐	☐	5. Verify wetting of bricks is properly performed if required to assure that mortar will bond to brick. Concrete masonry units are not wet.
☐	☐	☐	6. Verify mortar color is provided and approved if required.
☐	☐	☐	7. Verify layout of work, coursing and dimensions are as required or indicated.
☐	☐	☐	8. Confirm joint size, type, tooling method, and equipment are understood and produced.
☐	☐	☐	9. Verify mortar is mixed as required, and methods and equipment are suitable to produce the approved mix.
☐	☐	☐	10. Verify indicated bonding patterns are provided. Verify uniformity of laying.
☐	☐	☐	11. Generally observe mortar application to materials – full head and bed joints, shoving, and "buttering". Verify that complete filling of collar joints is as required in composite wall construction.
☐	☐	☐	12. Verify joints are tooled in such a manner as to provide a dense surface unless otherwise specified.
☐	☐	☐	13. Verify cutting of units is as required.
☐	☐	☐	14. Verify cleanouts are provided as required.
☐	☐	☐	15. Verify spaces between wythes are of sizes required and kept free of excess droppings.
☐	☐	☐	16. Confirm provisions are adequate to protect work at least 48 hours from freezing or longer if required to properly cure. Verify that acceptable cold weather precautions are provided when the temperature is less that 40°F.
☐	☐	☐	17. Confirm methods of cleaning are understood and performed as required. Ensure droppings and splatters on finished surfaces are cleaned as soon as possible.
☐	☐	☐	18. Verify anchors and ties are of type of material and size required and are installed as required.
☐	☐	☐	19. Verify reinforcement is of type, size, splicing, and spacing required that it is properly doweled, tied, and installed. Confirm additional reinforcement is provided as required for corners, intersections, openings, and lintels. Refer also to 03200 "Concrete Reinforcement".
☐	☐	☐	20. Do not allow bending rebar excessively to fit masonry cells. Verify approval has been obtained if required.
☐	☐	☐	21. Verify bucks, anchors, forming, supports, and other embedded materials are available, secured, plumb, or level and otherwise properly installed.
☐	☐	☐	22. Confirm provision for flashing, cut-outs, and later installation of other items is made.
☐	☐	☐	23. Confirm provision for parging or treatment of backs of walls which are to receive backfill is performed as required.

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INTEGRATING QUALITY CONTROL

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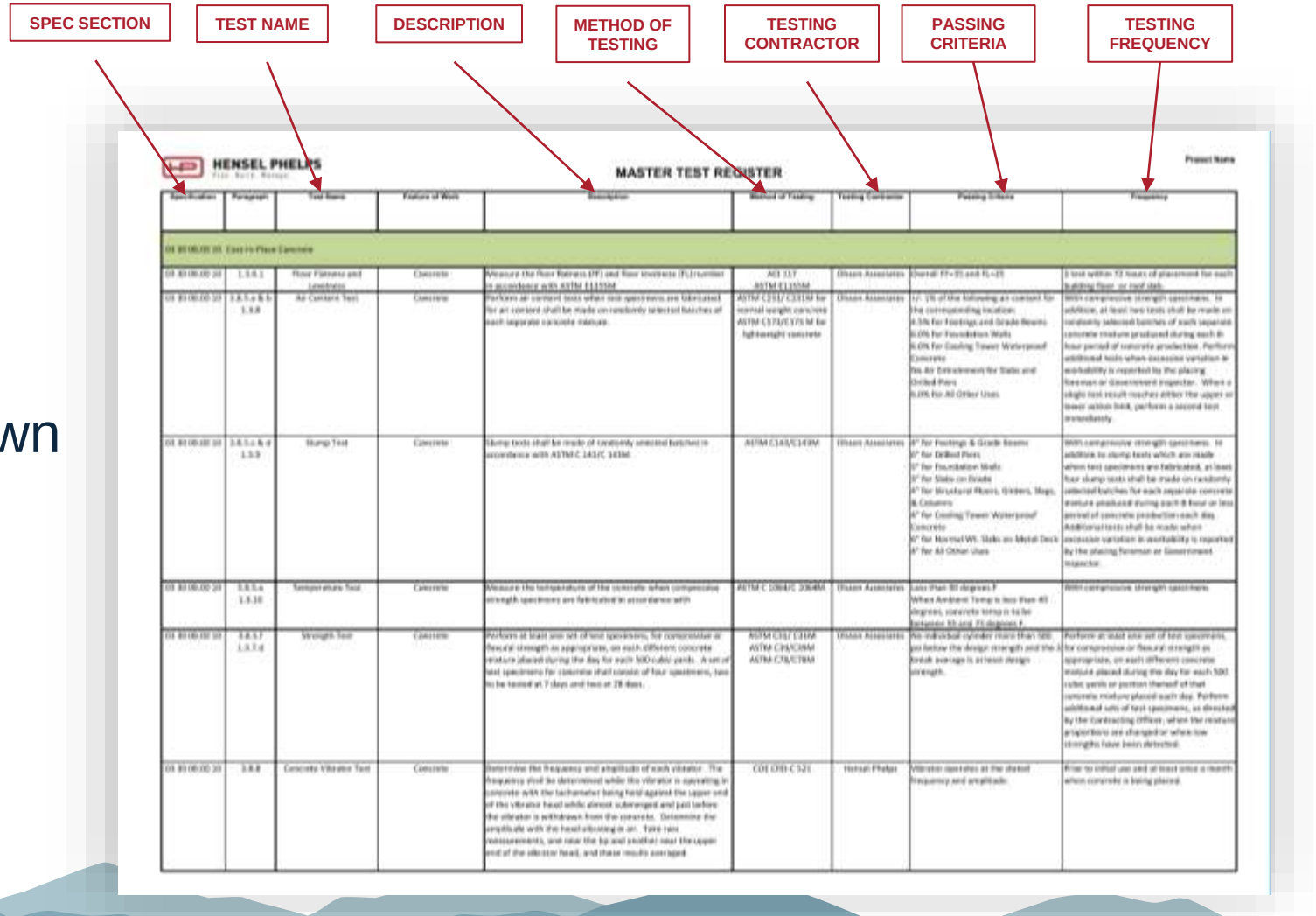
- List of Required Tests
- Developed Early Once Requirements Are Known
- Reviewed with Trade Partners During 6-Step Process



RISK ASSESSMENT DATABASE

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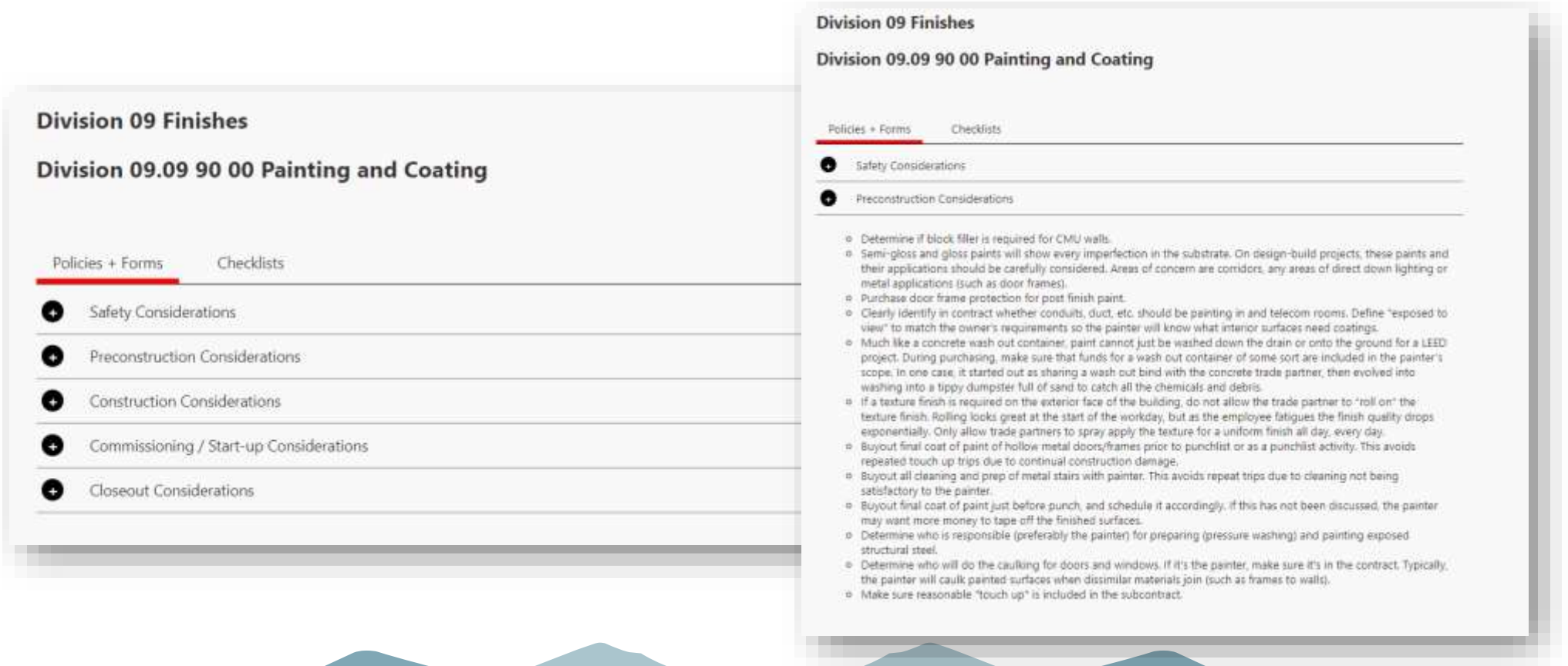
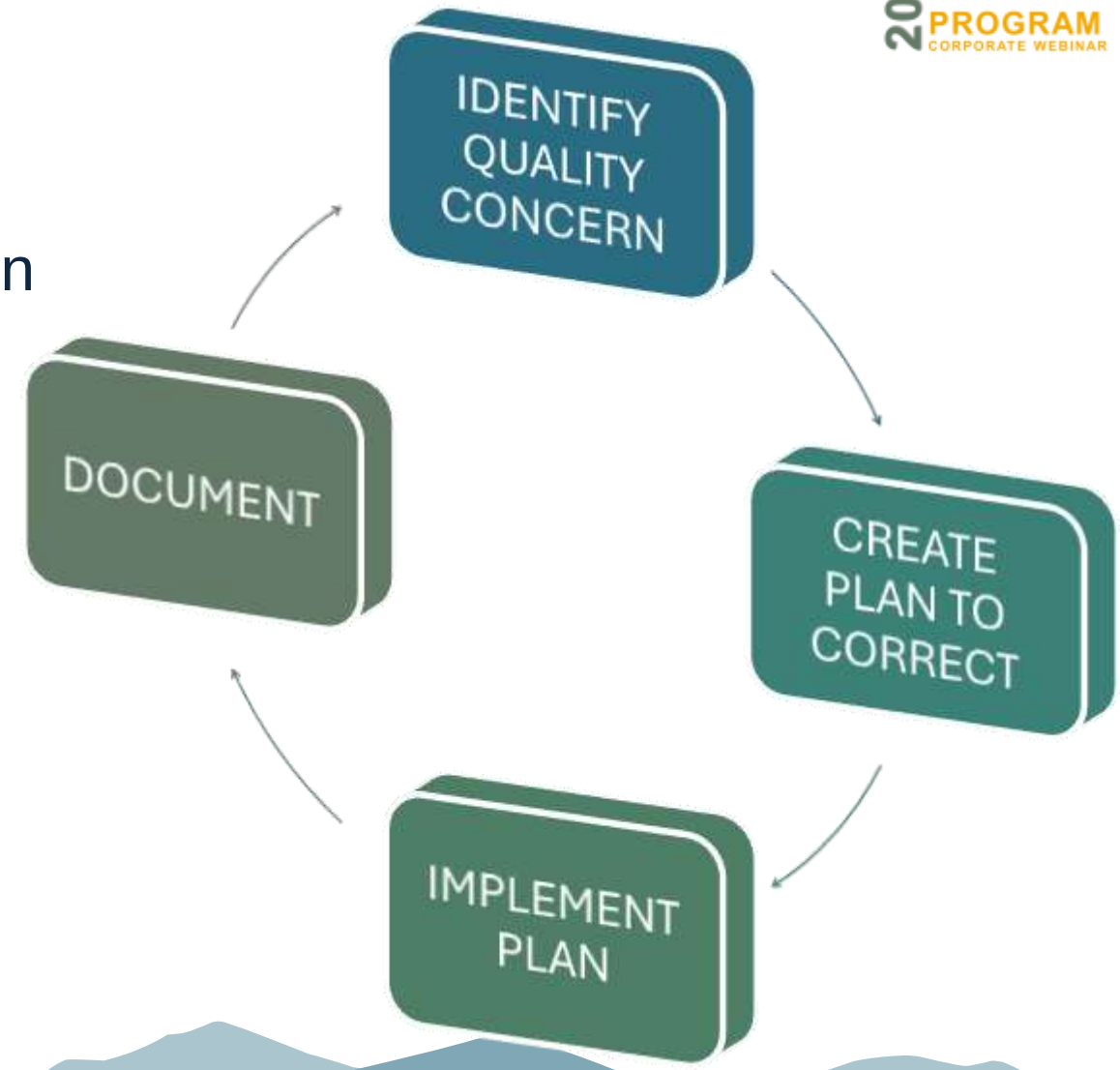
Identifies potential concerns that could negatively impact cost and / or schedule.



QUALITY AUDIT

- Quarterly
- Full Report of Strengths and Action Items
- Follow-Up Action Required



CONTINUOUS IMPROVEMENT PROCESS

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Continuous Improvement Process

Helps us implement betterments to our construction methods throughout the project

Do it BETTER!!!

Do it FASTER!!!

Do it CHEAPER!!!

Do it SAFER!!!

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Q&A

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William Scott

Senior QC Manager

wscott@henselphelps.com

THANK YOU

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