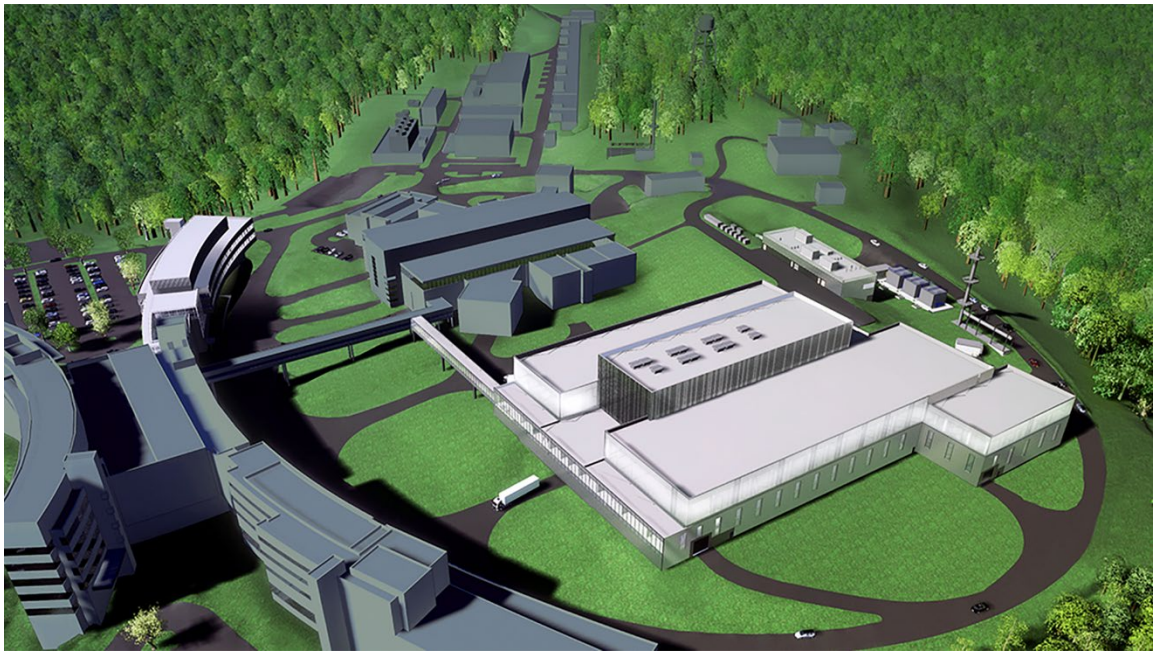
S03070000-MFP10000

Second Target Station Project: Target Station Shielding – Acquisition Strategy



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April 2025

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Second Target Station Project

TARGET STATION SHIELDING – ACQUISITION STRATEGY

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	Rev. 00	Date	Rev. 01	Date	Rev. 02	Date
Vessel Systems Lead Engineer	Christopher Anton Digitally signed by Christopher Anton Date: 2025.04.09 08:28:02 -04'00'					
Interface Systems Team Leader	Mike Strong Digitally signed by Mike Strong Date: 2025.04.09 09:30:09 -04'00'					
Target Systems Level 2 Manager	Peter Rosenblad Digitally signed by Peter Rosenblad Date: 2025.04.14 18:03:55 -04'00'					

Revision	Description
00	Initial Release

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LIST OF FIGURES

LIST OF ABBREVIATIONS

COTS	Commercial Off The Shelf
CV	Core Vessel
TS	Target Systems
TSS	Target Station Shielding
STS	Second Target Station

1. SCOPE

This document describes the acquisition strategy for the Target Station Shielding (TSS) scope within the Target Systems (TS) group of the Second Target Station (STS) project.

2. REFERENCES

Ref	Document Title	Document Number
[1]	Target Station Shielding Fabrication and Manufacturing Strategy	S03070000-MFP10001
[2]	Target Station Shielding Cost Estimation	S03070000-MFP10002

3. ACQUSITION STRATEGY

The Target Station Shielding scope will be acquired in a series of build to print manufacturing subcontracts with an estimated value of $2.4M, as seen in the Target Station Shielding Cost Estimation [2]. Target Station Shielding includes the following subsystems; Bulk Shielding, Removable Shielding, Core Vessel Baseplate, Bulk Shielding Liner and Pipe Pans. Due to the wide variety of component sizes and complexities, it is anticipated that several different vendors will be contracted to build various components of the TSS scope. A subset of TSS components are installed very early in the monolith installation process, however these components are expected to take much less time to fabricate than the Core Vessel (CV) that is installed in parallel with them. It is likely that the bulk shielding manufacturing contract will be split into two parts with the shielding below and around the Core Vessel nozzle extensions being ordered sooner than the remaining shielding to better sync with expected monolith installation activities.

3.1 BULK SHIELDING ACQUISITION STRATEGY

The bulk shielding will be constructed from low-cost carbon steel. Cobble or secondary plate steel similar to what was used on the FTS bulk shielding will be utilized. This type of steel offers a very low cost per pound price while still providing excellent radiation shielding performance. All bulk shielding blocks will be fabricated completely by an outside vendor. The method of construction of each shield block will be determined in collaboration with the shielding vendor. Stacked and welded plates is the most likely construction method to be employed. Each shield block will require final machining to produce drilled thru holes, blind tapped holes and outside profile features. Efforts will be made to minimize the tolerance requirements of these shield blocks to keep costs down as much as possible. Each shield block will be coated with an anti-corrosive coating to minimize rusting over the life of the facility. The Target Station Shielding manufacturing and fabrication strategy details all steps necessary to fabricate the bulk shielding [1]. Figure 1 below shows the collection of components that will be procured as part of the Bulk Shielding acquisition package.

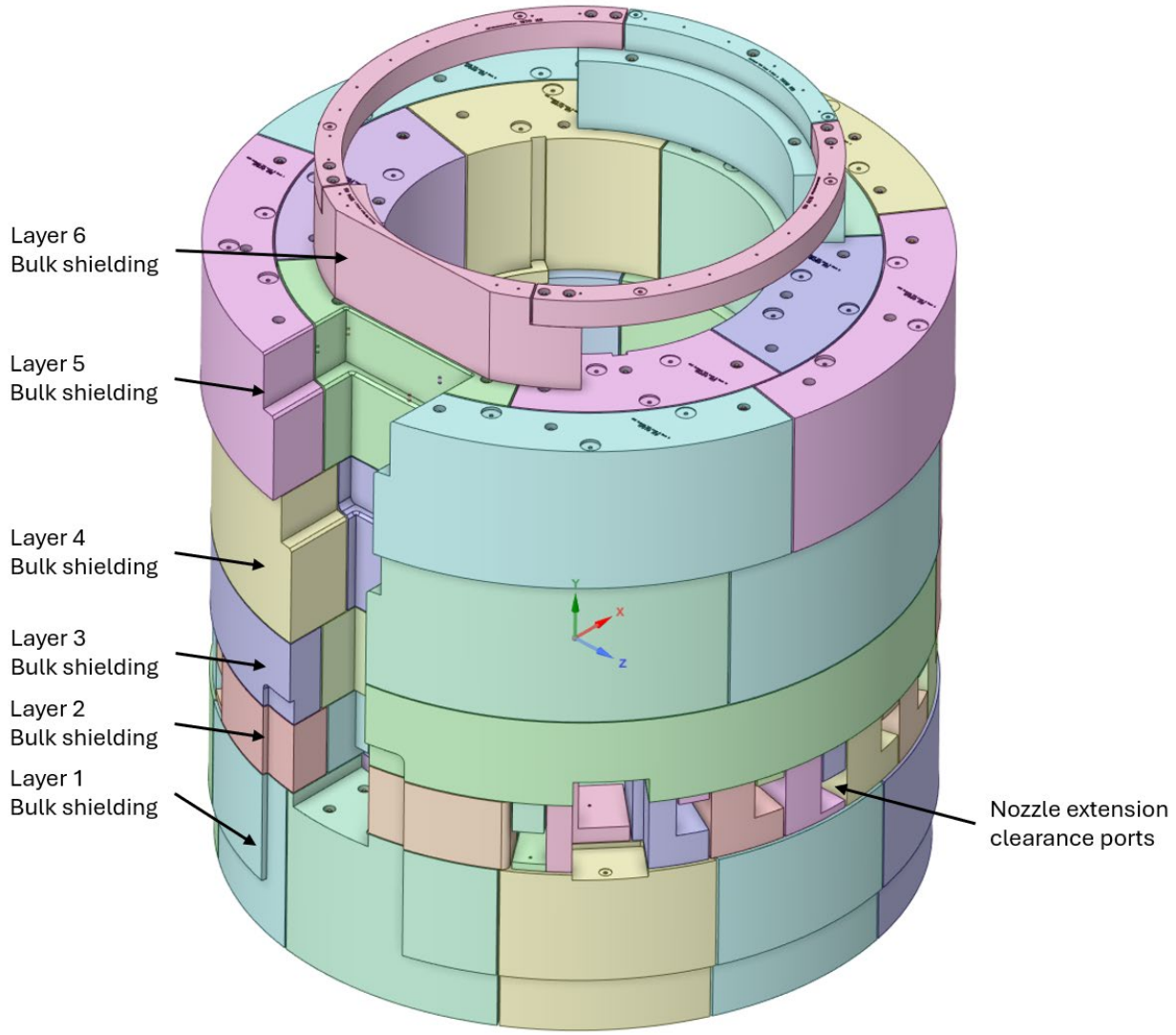

Figure 1: CAD image of TSS Bulk Shielding

3.2 REMOVABLE SHIELDING ACQUSITION STRATEGY

The AIC removable shield blocks will be constructed from the same low-cost steel to fabricate the bulk shielding components. The form factor of these blocks (See Figure 2) may necessitate a different fabrication strategy from the bulk shielding blocks. Details of the manufacturing approach will be determined in collaboration with the selected shielding vendor during the procurement process. The pipe pan cover plates will also be fabricated from low-cost carbon steel, likely secondary plate steel. These plates are 50mm thick and contain basic features that are not technically challenging to machine. Alternative machining approaches such as water jet cutting or plasma cutting will be considered to reduce overall costs. The Target Station Shielding manufacturing and fabrication strategy details all steps necessary to fabricate the removable shielding [1].

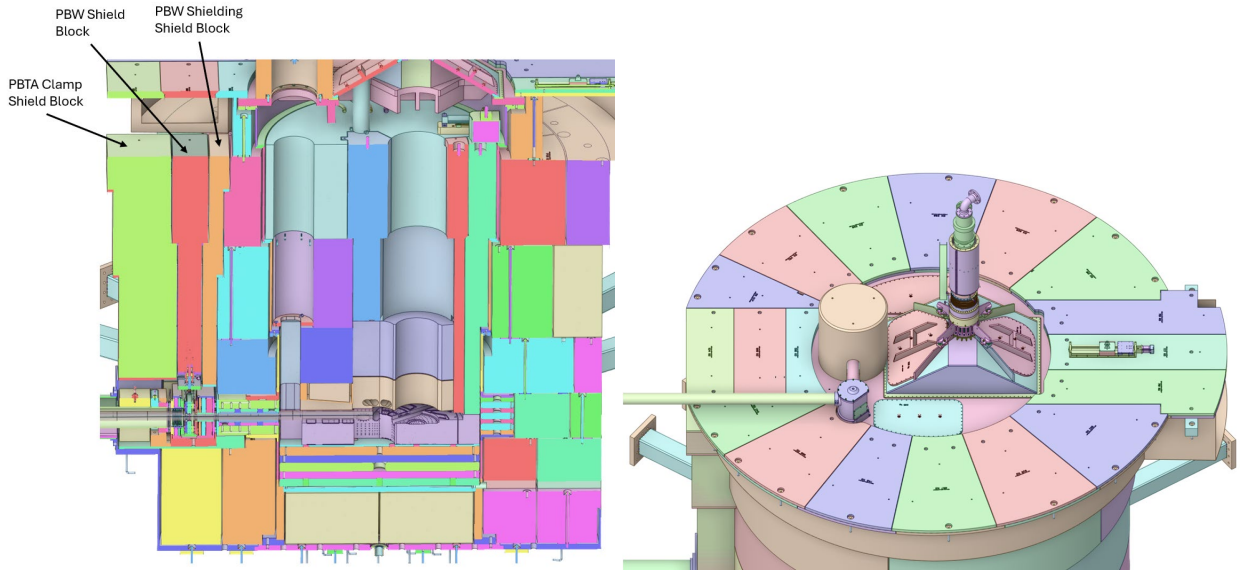

Figure 2: CAD image showing the AIC removable shielding (left) and Pipe Pan removable shield plates (right)

3.3 CORE VESSEL BASEPLATE

The CV Baseplate will be constructed from 75mm thick carbon steel. Low cost secondary plate or conventional A36 plate may be used depending on the form factors available. The machined features are all straight forward and should not pose a machining challenge (See Figure 3), however the large form factor of the CV Baseplate may limit the potential vendor pool that can efficiently machine this part. The CV Baseplate is one of the first components installed in the monolith, and procurement should be timed to coordinate completion of the CV baseplate with completion of the CV. The Target Station Shielding manufacturing and fabrication strategy details all steps necessary to fabricate the CV Baseplate [1].

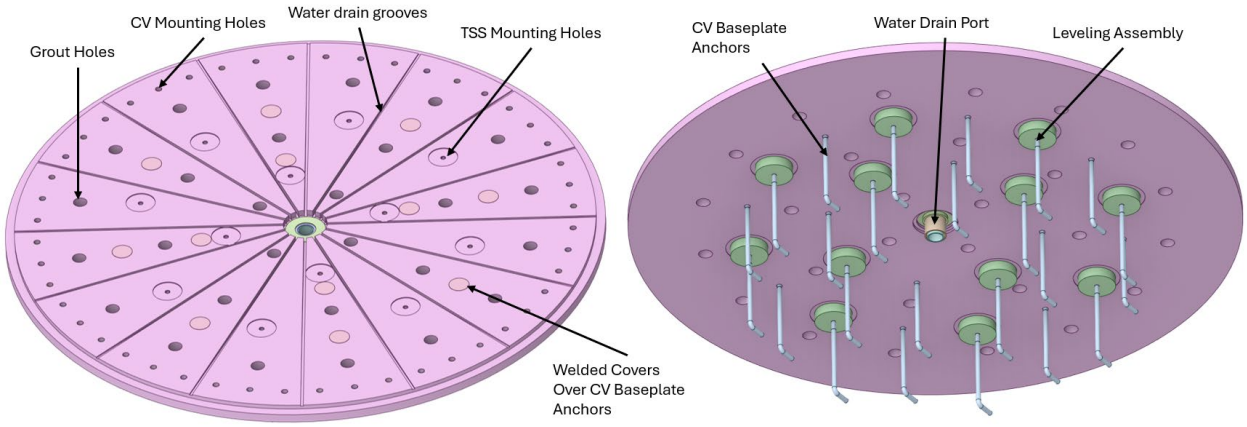

Figure 3: CAD images of the top and bottom of the Core Vessel Baseplate

3.4 BULK SHIELDING LINER ACQUSITION STRATEGY

The bulk shielding liner will be constructed from carbon steel with a combination of 75mm and 25mm finished thicknesses. Low-cost secondary plate steel will be employed where possible to save costs. The bottom section of the liner is constructed from 75mm thick plate and will likely be fabricated in sections and assembled/field welded together on site due to its large size. The Bulk Shielding Liner must be water

tight after all welding is complete. The side walls of the bulk shielding liner are 25 mm thick and will be rolled to the proper diameter and welded to the bottom section after installation in the monolith. Grout and anchor holes will be machined into the bottom plate prior to installation. Blind tapped anchor holes for mounting the first layer of bulk shielding will be located via survey and alignment and drilled/tapped in place using magnetic base drills to ensure accurate anchor hole locations. Figure 4 shows the general layout of the Bulk Shielding Liner. The Target Station Shielding manufacturing and fabrication strategy details all steps necessary to fabricate the Bulk Shielding Liner [1].

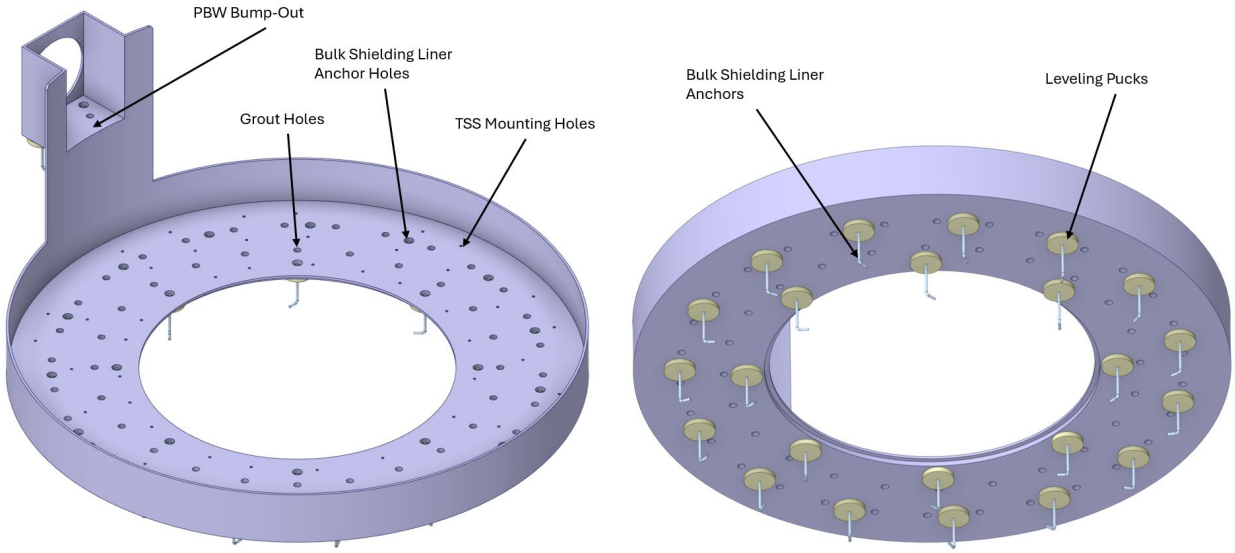

Figure 4: CAD images of the top and bottom of the Bulk Shielding Liner

3.5 PIPE PAN ACQUSITION STRATEGY

The pipe pans will be constructed from stainless steel sheet. They will be constructed in pieces and fit/field welded together in place after the bulk shielding is installed to form the finished pipe pan profile shown in Figure 5 below. Laser cutting will likely be employed to fabricate each pipe pan section due to its low cost when compared to traditional machining and better cleanliness for welding that water jet cutting. The Target Station Shielding manufacturing and fabrication strategy details all steps necessary to fabricate the pipe pans [1].

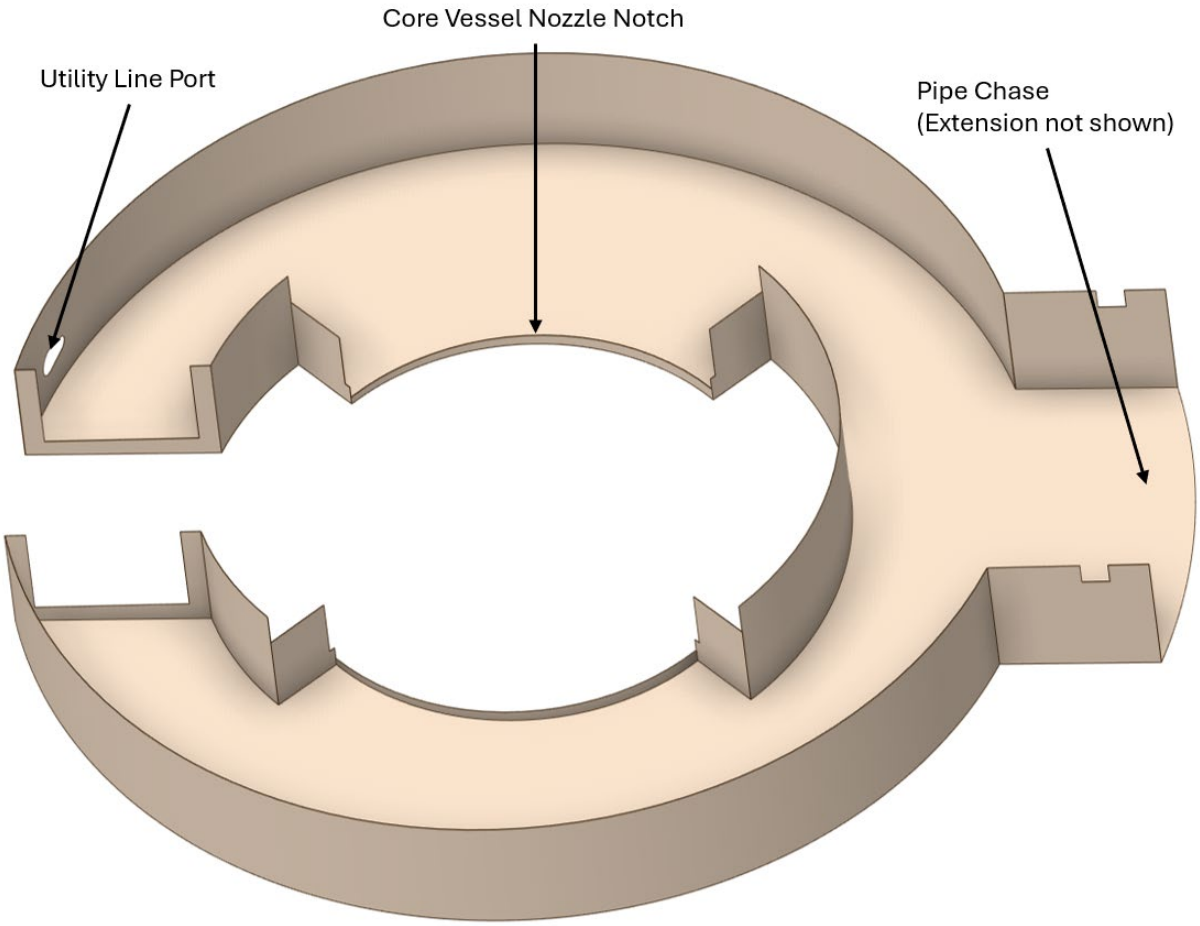

Figure 5: CAD image showing the Pipe Pan