

Overburden Plan(Infrastructure)

Jim Kilmer

Director's Progress Review of SBN

15-17 December 2015

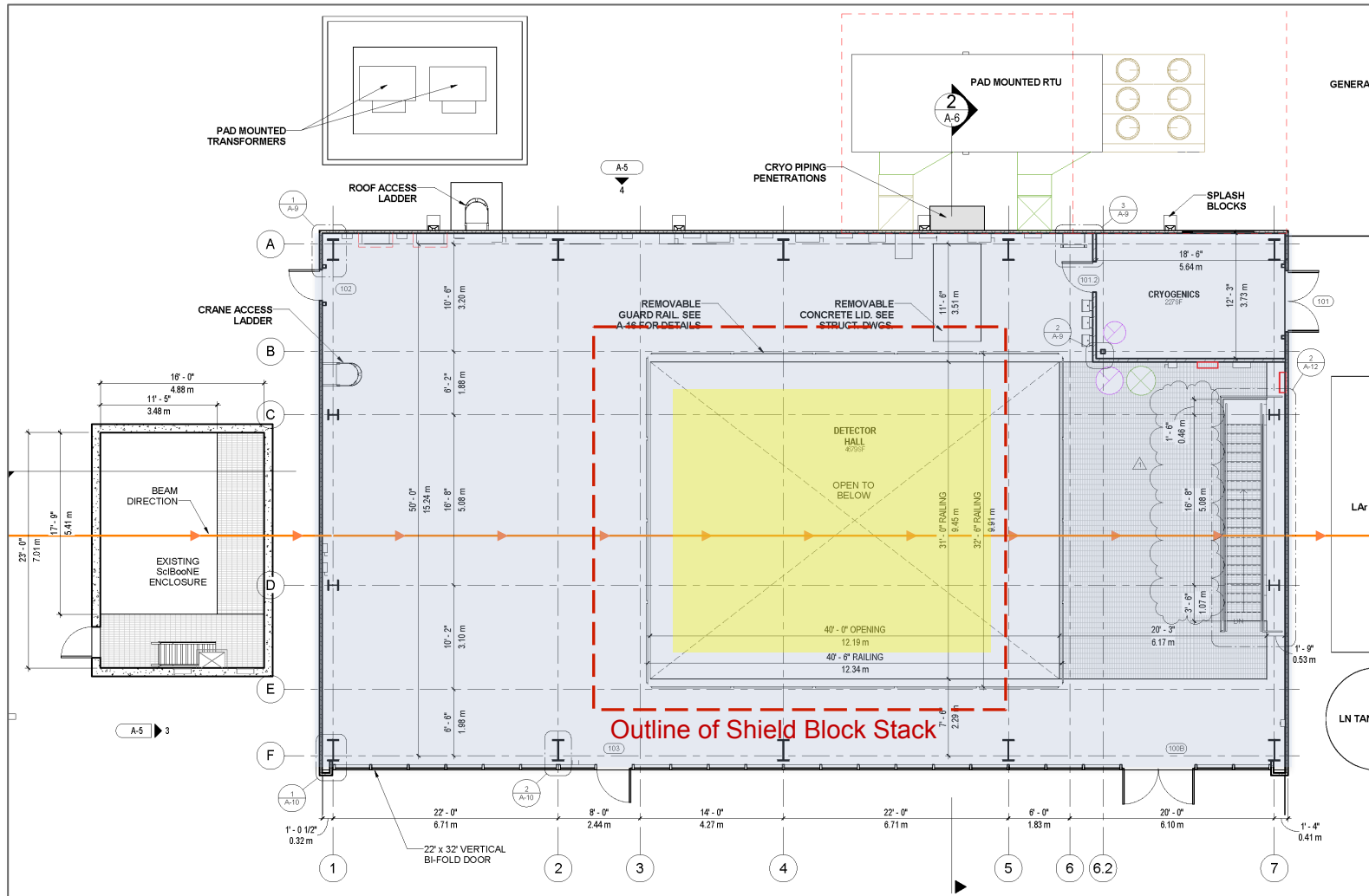
Outline

- System Overview
- Resources
- Basis of Estimate (for DOE costs)
- Schedule and Cost Summary
- ES&H and QA
- Status of design

System Requirements

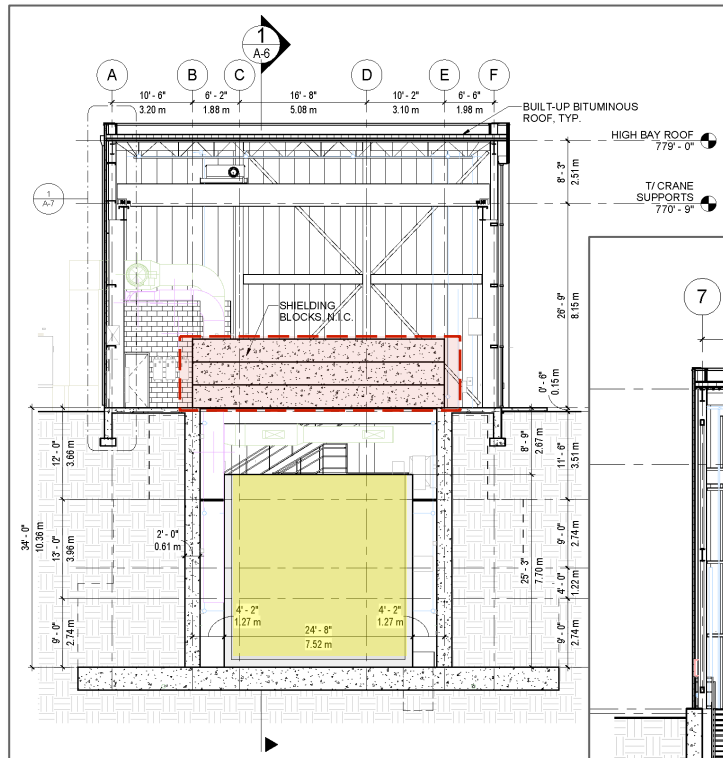
- Cover the experiment detectors with ~3 meters of shielding concrete
- Blocks must be small enough to be lifted by the building crane
- Bottom row of blocks must be designed to span the detector pit and carry all of the upper layers of shielding (**these block do not exist on site – not standard**)

SBN Near Detector Building (G15219)

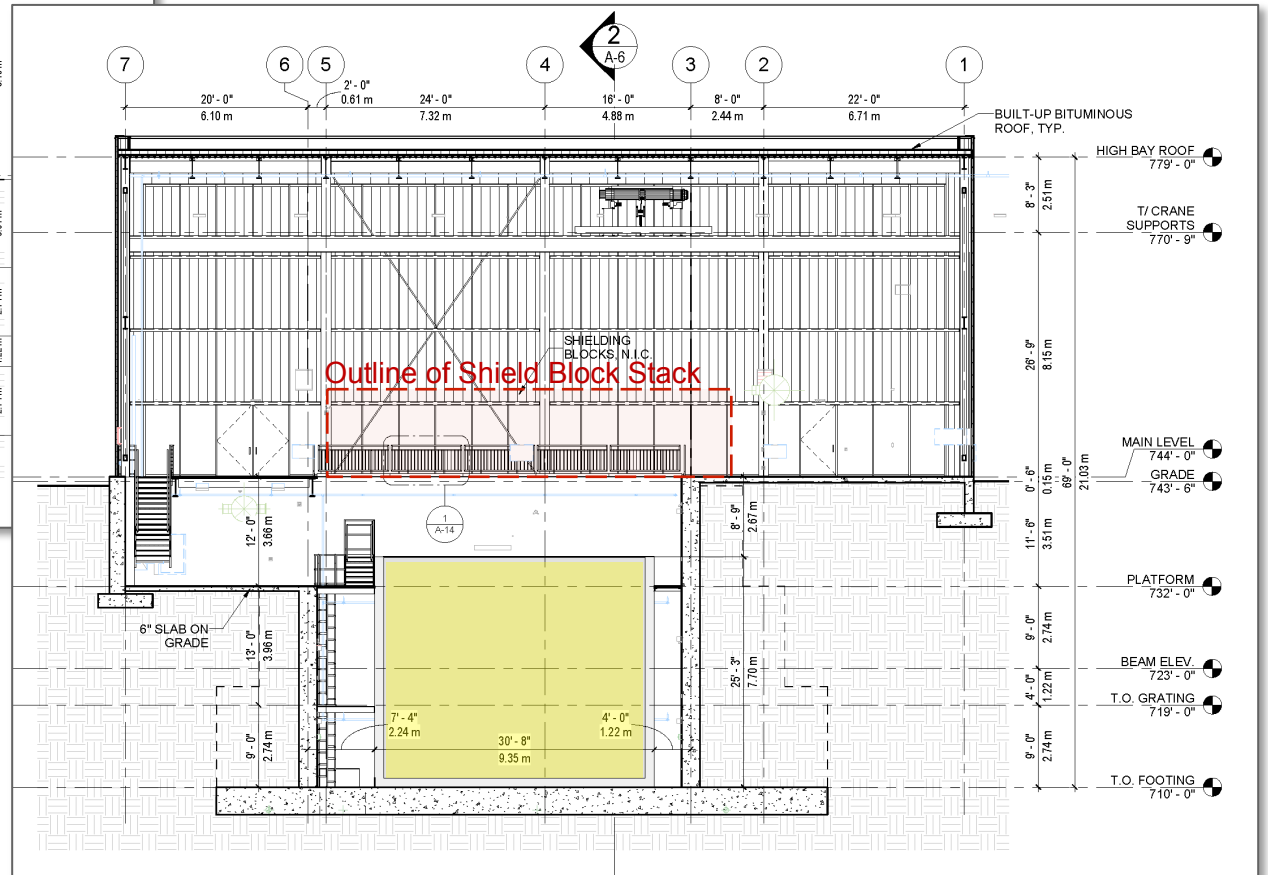


Plan at Grade Level

SBN Near Detector Building (G15219)

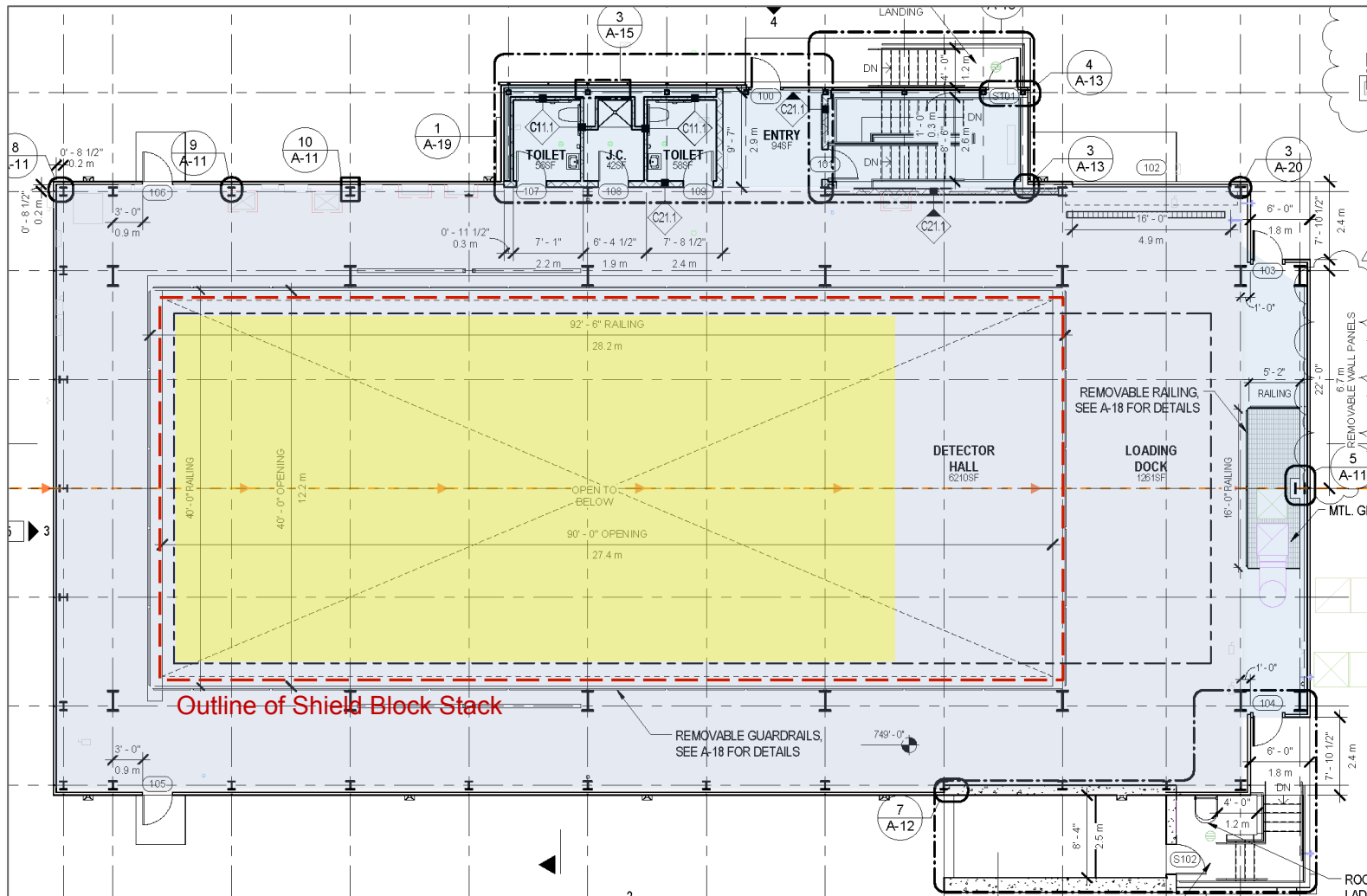


Section Looking South



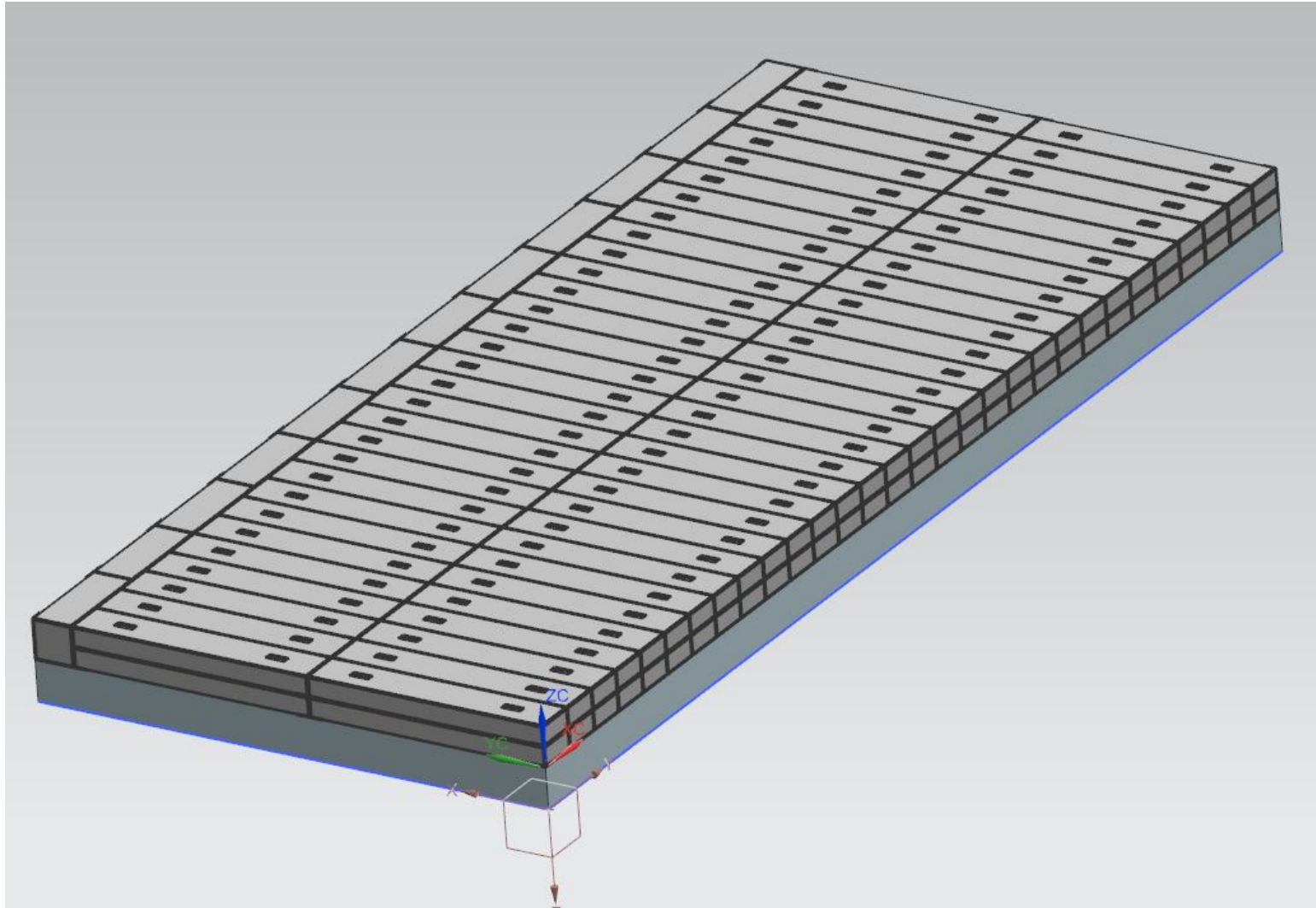
Section Looking East

SBN Far Detector Building (G15218)



Plan at Grade Level

Second layer of FD shielding



Resources for NE9 block mining

- Accelerator Division labor to remove old beamline components in NE9 (~48 man-days)
- PPD labor to recover blocks to a storage site and later place them into position (~150 man-days)
- Fermilab trucks and drivers to move blocks around site
- Rigging crew is not anticipated to be needed

Basis of Estimate

- NE9 block recovery
 - Contract labor (T&M) from verbal quotes and comparison with a previous recovery in 2010
 - Fermilab labor estimates from Dave Augustine and John Voirin (past work experience on similar jobs including NEA and NEB)
- SBN custom blocks
 - Cost based on three escalated quotes from the last six years
 - RFQ is out on the street now

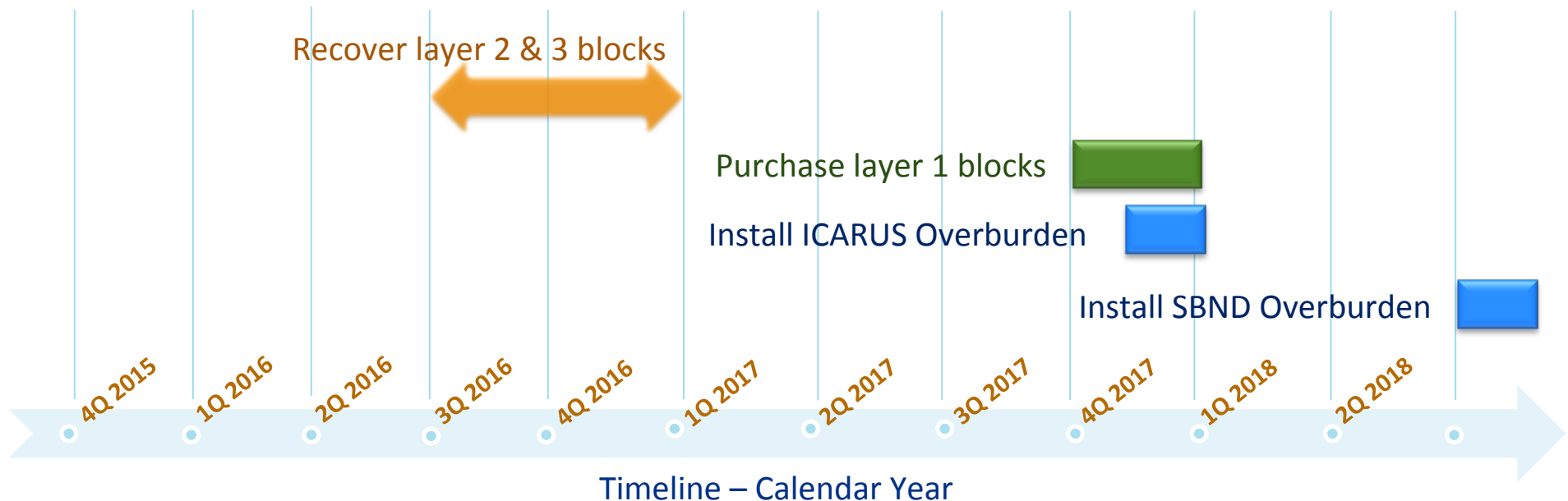
Purchased blocks – basis of estimate

Sales Quote 15499 - 09JUL09													
	Width	Height	Length	Volume			Quantity	Totals					
				cub inches	cub ft	cub yards			\$/block	Total	S/CY (FY09)	S/CY (FY16)	
				"A"	"B"	"C"							
					1728	27							
Type T7.5 (Upper)	18	18	90	29,160	16.9	0.6	34	21.3					
Type T7.5 (Lower)	54	18	90	87,480	50.6	1.9	34	63.8	\$1,945	\$66,130	\$778	\$918	
Type T12 (Upper)	18	18	144	46,656	27.0	1.0	24	24.0					
Type T12 (Lower)	54	18	144	139,968	81.0	3.0	24	72.0	\$2,295	\$55,080	\$574	\$677	
Type T12 Special (Upper)	18	18	144	46,656	27.0	1.0	4	4.0					
Type T7.5 Special (Lower)	54	18	144	139,968	81.0	3.0	4	12.0	\$2,540	\$10,160	\$635	\$749	
1.5 Square	18	18	18	5,832	3.4	0.1	8	1.0	\$605	\$4,840	\$4,840	\$4,840	
Type G	18	36	288	186,624	108.0	4.0	18	72.0	\$2,000	\$36,000	\$500	\$590	
								270.0	Total Volume (cubic yards)				
									\$172,210 Sales Quote Amount				
									\$638 per Cubic Yard				
							18%		\$115 Escalate from FY09 to FY16 (2.5% per year)				
									\$753 per Cubic Yard				
Purchase Order 608543 - 21SEP12													
	Width	Height	Length	Volume			Quantity	Totals					
				cub inches	cub ft	cub yards			\$/block	Total	S/CY (FY09)	S/CY (FY16)	
				"A"	"B"	"C"							
					1728	27							
Type T7.5 (Upper)	18	18	90	29,160	16.9	0.6	107	66.9					
Type T7.5 (Lower)	54	18	90	87,480	50.6	1.9	107	200.6					
								267.5	Total Volume (cubic yards)				
									\$286,610 PO Amount				
									\$1,071 per Cubic Yard				
							10%		\$107 Escalate from FY12 to FY16 (2.5% per year)				
									\$1,179 per Cubic Yard				
Purchase Order 624002 - 25SEP15													
	Width	Height	Length	Volume			Quantity	Totals					
				cub inches	cub ft	cub yards			\$/block	Total	S/CY (FY09)	S/CY (FY16)	
				"A"	"B"	"C"							
					1728	27							
Type E	36	36	18	23,328	13.5	0.5	22	11.0					
Type F	36	18	18	11,664	6.8	0.3	22	5.5					
Type L	36	18	12	7,776	4.5	0.2	20	3.3					
Type M	18	18	18	5,832	3.4	0.1	15	1.9					
Type S	18	36	24	15,552	9.0	0.3	10	3.3					
								25.0	Total Volume (cubic yards)				
									\$150,451 PO Amount				
									\$6,008 per Cubic Yard				

Overburden

Cost Estimate, \$k, fully burdened

Task	WBS	Funding	Estimate
Purchase ICARUS Layer 1	4.4.1.3.13	OPS	\$622
Purchase SBND Layer 1	4.4.2.2.1	OPS	\$217
Recover Layer 2 & 3 blocks, for all SBN	Not part of SBN costs	mixed	\$150
Install ICARUS Overburden	4.4.1.3.12	OPS	\$70
Install SBND Overburden	2.8.4.27	R&D	\$30



SBN



ES&H, QA

- ES&H considerations for this subsystem:
 - Met with ESHQ and AD rad safety folks to make sure the blocks we want are not still needed for shielding where they are now
 - Have talked with Eric McHugh about safety issues and requirements
 - All work will require Hazard Analysis and formal crane lift plans for the mobile crane

Response to Review Recommendations

- No technical review has been done yet

Status of Design

- Bridge blocks designed and RFQ out to vendors
- Remainder of shield blocks needed have been identified
- Resources for “mining” the old blocks has been identified and are available
- Layouts of each upper layer of both detectors have been done using available blocks
- Costs have been estimated