

# Prevention Through Design

## Legend

StP = Safety through Planning

PtD = Prevention through Design

#	Review	Category	Item	Mitigation	Applied
1	Foundations	PtD	Building Location in relationship to electrical farm and Sagamore	Moved building by 63' to minimize earth retention and underpinning	Y
2	Foundations	StP	Timely Ingress/Egress following steel erection	Sequencing steel erection in a manner that allow permanent stairs to be utilized as construction egress at the beginning of the project. Will result in only one temporary stair tower instead of two	Y
3	Foundations	StP	Rebar Delivery	Rebar delivered to the site in 2 week supply	Y
4	Foundations	StP	22' Foundation wall Formwork	Pre-assemble rebar/formwork on the ground and erect with crane. Reduces the amount of work being done at elevation	Y
5	Foundations	PtD	Checkerboard slab	Reduce slab "checkerboarding" – does not fully eliminate, but reduces number of pours/tripping hazard. Submit suggested slab pours to LeMessurier. Will need to review with floor finishes and discuss potential cracking	Y
6	Foundations	PtD	Diamonds at columns	Can diamonds be eliminated or reduced? Need to review with floor finishes and discuss potential cracking	Y
7	Foundations	PtD	SOG Return Bars	Drill & epoxy return bars @ SOG	Y
8	Foundations	PtD	Foundation Wall Utility Penetrations	Coordinate openings/sleeve penetrations. Minimize coring/saw cutting	Y
9	Foundations	PtD	Slab and mat foundation top reinforcing steel spacing	Review space slab and mat foundation top reinforcing steel at no more than 6" on center each way to provide safe walking surface	Y
10	Foundations	PtD	Top of Foundation wall Rebar	Design reinforcing steel at top of foundation walls to be turned down	Y
11	Foundations	PtD	Sequencing of backfill at E-Line wall	Backfill behind E-Line wall, added grade beams to provide structural support allowing wall to be backfilled to approx. halfway point. This reduces the size of the hole on site behind this wall by months. Still will be a 10'+ hole, but reduced from 22'.	Y
12	Foundations	StP	Anchor Bolts	Drilled and epoxied at the Sagamore Connector	
	Foundations	PtD	Rebar Lengths	Cut rebar to length ahead of delivery	Y
13	Steel	PtD	Lanyards and tie offs	Design floor perimeter beams and beams above floor openings to support lanyards beam clamps	Y

# Prevention Through Design

## Legend

StP = Safety through Planning

PtD = Prevention through Design

#	Review	Category	Item	Mitigation	Applied
14	Steel	PtD	Pre-Drilled Perimeter Safety Cable Holes	Design steel columns with holes at 21 and 42" above floor level to establish guardrail cables. Holes to be drilled on the interior third of the column webs to allow cables to stay in place during ext. wall construction	Y
15	Steel	StP	3rd Perimeter Cable Railing	3rd Cable will be installed to support tarps for wrapping building for winter weather. Will result in less work to install support and install tarps.	Y
16	Steel	StP	Safety Cable Maintenance	Turnbuckles to be used on cables spaced NO more than 125'	Y
17	Steel	PtD	Beam Penetrations - in shop vs in field	Coordinate beam penetrations in shop (as many as possible in lieu of field). If done in field increases the amount of hot work being done off of ladders	?
18	Steel	PtD	Leading Edge Tie-Off Points	Establish davit locations (high roof areas, window washing, connector, bridge. etc.). Both for maintenance and construction	Y
19	Foundations	PtD	Addition of footings for new bridge to Bourne	Timing & coordination of new bridge to Bourne vs. drainage. Coordinate with infiltration system/utilities so that no rework, undermining, or settling encountered.	Y
20	Foundations	StP	Stepping Foundations	Minimize the amount of stepping where foundation walls can be backfilled all the way	Y
21	Foundations	PtD	Window Washing	Establish method of maintenance for cleaning/servicing façade, so design can accommodate	Y
22	Foundations	PtD	Parapets	Add full height parapets at roof to protect both construction workers and permanent maintenance/operations. To be designed at height after accounting for tapered insulation. Mix of parapet and railing.	Y
23	Foundations	PtD	Parapet Coping	Pitch parapet coping in towards roof to prevent ice build up falling down the exterior face of building.	Y
24	Foundations	PtD	Walk-In Fridge that Freezer	Add depression for walk-in (kitchen) in lieu of ramp? Maintenance vs. Construction. Depression would get rid of long term operations tripping hazard, but would result in tripping hazard during construction	Y

# Prevention Through Design

## Legend

StP = Safety through Planning

PtD = Prevention through Design

#	Review	Category	Item	Mitigation	Applied
25	Foundations	StP	High Visibility lulls	Lulls with greatly diminished driver visibility will not be allowed on site	Y
26	Foundations	StP	Auto Shut off table saws	Only table saws with auto-sensing and shut off will be allowed on site	
27	Foundations	PtD	Mechanical equipment for Atrium	Find other location for Mechanical Equipment for Atriums (will avoid tall lifts to install/service in future)	Y
28	Foundations	PtD	Atrium Maintenance	Lifts for ground and second floor access	?
29	Foundations	PtD	Roof Access	Run the elevator to the roof for maintenance/operations	Y
30	Foundations	StP	Targeted Prefab: Metal Stud	Pre-fabricating as much work as possible to decrease the amount of cutting and hot work on site	Y
31	Foundations	StP	Targeted Prefab: Ductwork	Pre-fabricating as much work as possible to decrease the amount of cutting and hot work on site	Y
32	Foundations	StP	Targeted Prefab: Electrical	Pre-fabricating as much work as possible to decrease safety exposure during installation	Y
33	Foundations	StP		Worked with EMD to create "Continuous Ring Road" around campus for Emergency access - Communicate with Town Officials	Y
34	Foundations	StP	Site Access for emergency responders	6 Gates set up on site so Fire Dept/Emergency Responders have access from many approaches	Y
35	Foundations	StP	Prevent "Struck Utilities"	Cameras – additional camera line being relocated out of site to eliminate "struck utility" and loss of security feed.	Y
36	Foundations	StP	Minimize Fence Feet	Feet from fence being eliminated along areas where people may travel along fence	Y
37	Foundations	StP	East Infiltration System in the Ring Road	East Infiltration System – BSC has stated that this can be rotated to get out of the "Ring Road"	Y
38	Foundations	StP	Duct Bank	Communications Duct Bank – rather than demo and replace a large section of this, working to keep in place and add a small section to connect to building. Reduces the overall trench work *Not currently shown on drawings	Y
39	Foundations	PtD	Valves and Controls	Provide adequate access to all valves and controls	Y

# Prevention Through Design

## Legend

StP = Safety through Planning

PtD = Prevention through Design

#	Review	Category	Item	Mitigation	Applied
40	Foundations	PtD	Equipment and controls	Orient equipment and controls so they do not obstruct walkways and work areas	Y
41	Foundations	PtD	Shut off valves and switches	Locate shut off valves and switches in sight of equipment of which they control	Erland
42	Steel	PtD	Welded Connections	Design welded connection such that the weld locations can be safely accessed	Y
43	Steel	StP	Beam Seats	Seat angle underneath every beam	Y
44	Steel	StP	Beam/Girder Locations	At smaller beams terminating at girders - adding a seat in the web of the girder	Erland
45	Steel	StP	Erection Bolts	Erection bolts - Temporary bolts and staggered clips	Erland
46	Steel	StP	Truck Deliveries	Staging Platforms? - Erland and Ocean will continue to discuss options.	Erland
47	Steel	StP	Size/Weight of Angles	Decrease length of delivered angles to make angles easier to manoeuvre by concrete sub	Y
48	Steel	StP	Embed Installation	Provide nailer holes at embeds. Reduces work of to attach emdeds to concrete	Erland
49	Steel	StP	Slab Penetrations. Deck over Openings	Coordinate slab penetrations	Y
50	Steel	StP	Eliminate added support at Davit Locations	Locate Davits over existing steel structure as much as possible to prevent additional support steel being added. Locating ahead of time will also result in shop welding of stiffeners instead of field welding	Y
51	Steel	StP	Field Welded Connection Access	Utilizing a lift where ever possible for moment connections. S1.03 - Steel will need to be temporarily supported - S1.05 Upepr roof access for moment conenctions are a concern	Erland
52	Steel	StP	Cantelevering Steel at Balconies - Access	Steel was detailed to eliminate concerns with cantelevered	Y
53	Steel	StP	Splice connections to be at 4'6" AFF	Allows work at connections to be done at waist height rather than having to bend over	Y
54	EMD DD Review	PtD	Water feature - safety hazard, legionella, humidty concerns in space	Design with proper filtration to remove bio-growth	Y

# Prevention Through Design

## Legend

StP = Safety through Planning

PtD = Prevention through Design

#	Review	Category	Item	Mitigation	Applied
55	EMD DD Review	PtD	Fall hazards at roof edges	Provide 42" parapet or railings along all roof edges including dock	Y
56	EMD DD Review	PtD	Safe and clear walkways between elevator to all equipment and to roof drains	Provide roof pads - walkways between elevator to all equipment and to roof drains	Y
57	EMD DD Review	PtD	sagamore connector & bourne bridge have fall hazards	Provide parapets/railings on sagamore connector roof & bourne bridge roof	Y
58	EMD DD Review	PtD	window washing - potential fall hazard	Provide anchoring system for window washing	Y
59	EMD DD Review	PtD	Emergency - active intruder	Each floor needs a couple lockdown areas	Y
60	EMD DD Review	PtD	Elevator shaft - safety precaution/ fall hazard	Provide rails on top of elevator shaft	Y
61	EMD DD Review	PtD	main labs - should have EPO outside of lab entrances	EPOs for the main labs should be <b>outside</b> of lab entrances	Y
62	EMD DD Review	PtD	All fire extinguishers for the building must be within a recessed fire extinguisher cabinet (Surface mount only in electrical/mechanical rooms)	Fire extinguishers for the building kept in fire extinguisher cabinet (Surface mount only in electrical/mechanical rooms)	Y
63	EMD DD Review	PtD	O2 depletion sensor not Required in Freezer Farm	Don't put an O2 sensor in the freezer farm	Y
64	EMD DD Review	PtD	Central Storage -floor	Central Storage requires epoxy resin floor - Sealed Concrete applied accomplishing purpose	Y
65	EMD DD Review	PtD	No plan that indicates the control zones for the first floor	Create a plan that indicates control zones for first floor	Y
66	EMD DD Review	PtD	North stairs upper parking - path instead	Re-evaluate North stairs to upper parking lot with path instead	N
67	EMD DD Review	PtD	If stairs to upper parking lot must remain	Remove wood stairs as it will be a serious slip hazard in winter and will get beat up with de-icing chemicals	Y
68	EMD DD Review	PtD	No safety station in Ground Mechanical Room	Implement Safety station in Ground Mechanical Room	Y
69	EMD DD Review	PtD	ALL cold rooms require Infrared-sensor type Refrigerant Gas leak detection systems (Honeywell 301IRF)	Implement Infrared-sensor type Refrigerant Gas leak detection systems (Honeywell 301IRF) in ALL cold rooms	BR+A

# Prevention Through Design

## Legend

StP = Safety through Planning

PtD = Prevention through Design

#	Review	Category	Item	Mitigation	Applied
70	EMD DD Review	PtD	Cylinder Storage requires Oxygen monitoring system (RKI Beacon)	Oxygen monitoring system (RKI Beacon) implemented into Cylinder Storage	BR+A
71	EMD DD Review	PtD	No Safety Station in Back of House of Ground Kitchen	Implement Safety Station in Back of House of Ground Kitchen	Y
72	EMD DD Review	PtD	New Generator Stack - height needs to comply with recent MA DEP Regulations and modeling study conducted and reduce impact on existing buildings	Implement New Generator Stack height that comply with recent MA DEP Regulations and modeling study conducted. Stack added to existing generator	Y
73	EMD DD Review	PtD	Boilers need Combustible Gas and Carbon Monoxide leak detection system (RKI Beacon)	Implement Combustible Gas and Carbon Monoxide leak detection system (RKI Beacon) in boilers	Y
74	EMD DD Review	PtD	Fire Alarm strobes need be in all tissue culture labs due to noise from equipment and drowning out horns from outside of TC L	Fire Alarm strobes put in all tissue culture labs	BR+A
75	EMD DD Review	PtD	Fire Alarm strobe needs to be installed in each PCR room	Fire Alarm strobe put in each PCR room	BR+A
76	EMD DD Review	PtD	Phone required in Ground floor service cooridor to support Electrical rooms and Mech Room emergencies	Implement phones in Ground floor service cooridor to support Electrical rooms and Mech Room emergencies	Phil
77	EMD DD Review	PtD	Phone required within Main Labs entries	Implement phones within Main Labs entries	PHil
78	EMD DD Review	PtD	Phone required at Roof Elevator lobby	Implement a phone at Roof Elevator lobby	Y
79	EMD DD Review	PtD	Print Room doors must have glass panels and door closures OR on fire alarm hold opens	Implement glass panels and door closures OR on fire alarm hold opens for print room doors	Y
83	EMD DD Review	PtD	Roof above loading dock requires anchoring system	Install parpet per remainder of building	Y
84	EMD DD Review	PtD	Roof above elevator needs achoring system	Railings at top of elevator penthouse	Railings
85	EMD DD Review	PtD	Wood board walk is not a safe option for winter use, slip hazard and will get beat up with snow removal and de-icing materials	Implement safe and durable option for winter use of Wood board walk - Replace with cast in place concrete	Y

# Prevention Through Design

## Legend

StP = Safety through Planning

PtD = Prevention through Design

#	Review	Category	Item	Mitigation	Applied
87	EMD DD Review	PtD	Wooden Emergency Egress gates at patio need to have illuminated EXIT signs	Implement illuminated EXIT signs at Wooden Emergency Egress gates at patio	Y
88	EMD DD Review	PtD	Overhead doors shown around the indoor lift should be on the elevated loading dock side and interlocked with the lift position to prevent fall hazard from elevated area	Removed raised loading dock so roll up doors not needed	Y
90	EMD DD Review	PtD	EW/SS needs to be relocated from upper to lower open work space	Locate somewhere to Relocate EW/SS from upper to lower open work space - implement relocation	?
91	EMD DD Review	PtD	Gate system around 8x10 lift will require interlocks to prevent accessing platform unless it is on that floor	Implement interlocks to Gate system around 8x10	Y
92	EMD DD Review	PtD	IDF Closet next to Freezer Farm - door needs to swing inward	change door swing inward	Y
93	EMD DD Review	PtD	Safety Nook required at Security Desk (area for contractor safety training)	Implement Safety Nook at Security Desk	Y
96	EMD DD Review	PtD	MT epoxy surface needs to have a ledge on rear to prevent materials from rolling off the rear of the table.	Implement a ledge on rear MT epoxy surface.	Y
97	EMD DD Review	PtD	MT shown above 7' tall, all lab entrances as marked are 7' tall. Need to have doorways into labs at 8'	Make doorways into labs at 8'	Y
98	EMD DD Review	PtD	Provisions for passthroughs for waste lines to go through table to waste can	Implement waste lines through table to waste can	Y
99	EMD DD Review	PtD	Lab ergonomics ie monitor arms, laptop/pc storage etc - laboratories	*****	Open
100	EMD DD Review	PtD	ADO Scope to be reviewed/developed	Review and develop ADO Scope	Y
101	EMD DD Review	PtD	Entire Lab floor on generator backup power	Implement generator backup power for entire lab floor	Y
102	EMD DD Review	PtD	NOT all lab rooms have emergency lighting	Ensure all lab rooms have emergency lighting	Y
103	EMD DD Review	PtD	Cell Bank Room - N2 gas heavy, room exhaust should be in wall low to near floor, around entire perimeter of room.	Put room exhaust in wall low to near floor, around entire perimeter of room.	Y
104	EMD DD Review	PtD	Coordinate FCU's in lab in isle's bwtm benches	Verify and implement FCU's in lab in isle's bwtm benches	Y

# Prevention Through Design

## Legend

StP = Safety through Planning

PtD = Prevention through Design

#	Review	Category	Item	Mitigation	Applied
105	EMD DD Review	PtD	Protein Science T/C - open concept needs to be reviewed - can HVAC be properly balanced? (very concentrated, open area)	Have BSC expert review open concept - verify if HVAC can be properly balanced - implement decision	Y
106	EMD DD Review	PtD	There are no note detailing all main/branch isolation valves to be in hallway/isles, and none in conference rooms or offices	Provide note detailing all main/branch isolation valves to be in hallway/isles, and in conference rooms or offices	?
107	EMD DD Review	PtD	ALL coldrooms need to have doorways flush inside and outside with floors like North Building, DO NOT duplicate what is in south.	Make sure ALL coldrooms need to have doorways flush inside and outside with floors like North Building, and make sure to NOT duplicate what is in south.	Y
108	EMD DD Review	PtD	Need to change loading dock to ALL ground level with platform lifts at each dock door and remove the two level design.	Change loading dock to ALL ground level with platform lifts at each dock door and remove the two level design. This helps with addressing the ramp challenge and provides most flexibility of use.	Y
109	EMD DD Review	PtD	Question regarding the trench drain at primary grade level entrance.	Consider different options trench drain at primary grade level entrance - then implement	Y
110	EMD DD Review	PtD	At Design Development phase, a Code Review sheet should be issued. Likewise, an AG-003 sheet, Fire Ratings Diagrams should be included in the Drawing Set.	Issue a code review sheet. Issue an AG-003 sheet, include Fire Ratings Diagrams in the Drawing Set.	Y
112	EMD DD Review	PtD	Provide berm needed at Ice Machine.	Provide berm at Ice Machine.	N
113	EMD DD Review	PtD	Consider revising door so that it does not swing into users at the PCR bench and conforms to MAAB and ADA regulations.	Develop options for the door - implement best one	Y
114	EMD DD Review	PtD	PCR - No passthrus shown - confirm proper passthrus and provide as needed	Create options - confirm proper passthrus and provide as needed	Y
115	EMD DD Review	PtD	No water piping or drains above MDF/IDF/AV/Security/Electric	Implement water piping or drains above MDF/IDF/AV/Security/Electric	Y
116	EMD DD Review	PtD	all bathrooms need peep holes and locable from inside	Provide all bathrooms with peep hole and locable from inside	Y
117	EMD DD Review	PtD	No venting to stair towers	Add venting to stair towers for smoke evac	Y
118	EMD DD Review	PtD	Biowaste Storage Room needs to be exhausted/negative to hall way due to odors	Exhaust Biowaste Storage Room/negative to hall way	Y

# Prevention Through Design

## Legend

StP = Safety through Planning

PtD = Prevention through Design

#	Review	Category	Item	Mitigation	Applied
119	EMD DD Review	PtD	Freezer Farm needs 3 floor drains, ice machine, and 2 others for defrosting freezers (marked on arch plans)	Implement 3 floor drains, ice machine, and 2 others for defrosting freezers in Freezer Farm	Phil
120	EMD DD Review	PtD	Labs Central Storage room needs floor drain for defrosting freezer (marked on arch plan)	Implement floor drain for defrosting freezer in Labs Central Storage room	Phil
121	EMD DD Review	PtD	Kitchen needs an automatic grease/oil waste pumping system (Contact Baker Commodities for ideas) Do not want to transfer or store waste oil outside	Implement an automatic grease/oil waste pumping system in kitchen - Do not transfer or store waste oil outside	Y
122	EMD DD Review	PtD	Loading Dock - Provide option for ramp in place of stairs connecting upper dock to main level; alternate to lift in case it goes down	Draft and implement option for ramp in place of stairs connecting upper dock to main level; alternate to lift in case it goes down	Y
123	EMD DD Review	PtD	Electronic Dock Levelers required at each LD bay	Implement Electronic Dock Levelers at each LD bay	Y
124	EMD DD Review	PtD	Cell Bank - Roll up or removable access panel required for moving Cell Bank units into and out of space	Implement a Roll up or removable access panel required for moving Cell Bank units into and out of space	Y
125	EMD DD Review	PtD	Biacore Lab - NEED D32 wing door	Biacore Lab - add D32 wing door	phil
126	EMD DD Review	PtD	Avoid all water plumbing in Cell Bank Room, especially at floor level (radiant heating) ==> LN2 can flash freeze piping	Do not touch water plumbing in Cell Bank Room, especially at floor level (radiant heating) ==> LN2 can flash freeze piping	Phil
127	EMD DD Review	PtD	Sinks inside T/C spaces should have a both manual and handsfree option for handwashing (foot pedals?)	Implement both manual and handsfree option for handwashing for sinks inside T/C spaces(foot pedals?)	phil
128	EMD DD Review	PtD	2.5.D. Lead Free	Make sure 2.5.D. is Lead Free	Y
129	EMD DD Review	PtD	Need to specify use of "SuperStud" framing system	Specify use of "SupeStud" framing system	N
130	EMD DD Review	PtD	All energized switches/outlets must be covered with wall plates prior to energizing circuits	Cover all energized switches/outlets with wall plates prior to energizing circuits	?
131	EMD DD Review	PtD	Only battery operated hand tools allowed - drills/saws	Use only battery operated hand tools - drills/saws	Erland

# Prevention Through Design

## Legend

StP = Safety through Planning

PtD = Prevention through Design

#	Review	Category	Item	Mitigation	Applied
132	EMD DD Review	PtD	Contractor responsible for testing IAQ for any potential exposure to those working with hazardous materials or others in area for adequate ventilation	Contractor needs to test IAQ	Y
133	EMD DD Review	PtD	Underslab utilities need to be installed flush to slab or extend 48" above FF	Underslab utilities installed flush to slab or extend 48" above FF	Y
134	EMD DD Review	PtD	Material storage not permitted within 10' of building perimeter	Do not have material storage within 10' of building perimeter	Y
135	EMD DD Review	PtD	Candy cane rebar	Use candy cane rebar	Y
136	EMD DD Review	PtD	Saw Stop's reqd	Use Saw Stop's	Erland
137	EMD DD Review	PtD	2.3.F Lead Free	Keep 2.3.F Lead Free	Y
138	EMD DD Review	PtD	2.2.B.2 Lead Free	Keep 2.2.B.2 Lead Free	Y
139	EMD DD Review	PtD	2.3.B Electrically acutated dock leveler reqd - no hydraulics	2.3.B Use Electrically acutated dock leveler - and no hydraulics	N
140	EMD DD Review	PtD	Hydraulic elevators are not acceptable	Delete selection - Do not use hydraulic elevators	Y
141	EMD DD Review	PtD	Column splice details	Revise column splice details and make them as safe as possible	Y
143	EMD DD Review	PtD	the "overlook" spaces need to be confirmed	Confirm how the "overlook" spaces will be structurally supported	Y
144	Fire Department Meeting	PTD	Add additional Knox Box and annunciator to loading dock area		Y
145	Roof Top Unit Review	PTD	Review changing from dunnage to curb mounts for the roof top units		Y
146	Roof Top Unit Review	pTD	Re-route airhandler roof top ducts to minimize duct crossings		Y
147	Roof ductwork	PTD	build stairs over duct to avoid climbing over		Y
148	Roof Top Unit Review	pTD	Build platforms at air handlers doors to enable better working conditions		Y
151	Sump Pump Meeting	PTD	Sump Pump and Well	Eliminating the sump pump by installing perforated foundation piping through the building and tie into the infiltration system	Y
152	BSC SKC-03	StP	Undermining Existing Utilities	Utilize existing pipe	Y

# Prevention Through Design

## Legend

StP = Safety through Planning

PtD = Prevention through Design

#	Review	Category	Item	Mitigation	Applied
153	D&M	StP	Backfilling in a deep pit	Backfill grease trap with stone in lieu of fill	Y
155	Hot work	StP	hot work	focus on keeping as much hot work outside of the building as possible	Y
157	CD	PTD	Change from PVC to TPO		Y
158	CD	PTD	Keep any piping for the laboratories out of the electric room		Y
159	CD	PTD	install epoxy installed rings at lab waste slab penetrations to avoid trip hazard at penetrations and to keep lab spills from leaking through to the floor below.		Y
160	CD	PTD	Utilize Dry Mix Fire Proofing versus wet mix		Y
161	CD	PTD	Prefab HVAC piping		Y
162	CD	PTD	Oil Tank - under the generator	require secondary containment - talk to IESC to confirm	Erland
163	CD	STP	Use buggy to move concrete along slabs		Y