Comparison of drainage available vrs potential incoming Firewater

Room	PrD [2]	Strength		Type [1, 3]					Flow to drain when sprinkler is activated (m^3/hr)		Flow from the sprinkler system to room(s)			Drain Flow <= Sprinkler Flow	Water hold up per minute in the room		Water hold up (m^3/min) is associated with:					ADC Storage	
		High	Low	Pop Up	Closed	Open	Tundish	Trench	High Strength	Low Strength	Area (m^2)	Density (mm/min)	Flowrate (m^3/hr)		m^3	mm	Lyo	Con/Form	Fill	Low	Inspection		
Buffer Prep	1		L		C				0	0													
Buffer Prep	2		L		C				0	0													
Buffer Prep	3		L		C				0	0													
Buffer Prep (New)	N/A	H		P					63	0													
TOTAL									**63**	**0**	**105**	8	50.4	No	-0.21	-2		-0.21					
Conjugation	3	H			C				0	0													
Conjugation	4	H			C				0	0													
Conjugation	5	H			C				0	0													
Conjugation	7	H			C				0	0													
TOTAL									**0**	**0**	**133**	8	63.84	Yes	1.06	8		1.06					
Conjugation Service corridor	6	H			C				0	0													
Conjugation Service corridor	XX		L		C				0	0													
Conjugation Service corridor	XX		L		C				0	0													
Conjugation Service corridor	XX	H		P					63	0													
TOTAL									**63**	**0**	**43**	8	20.64	No	-0.71	-16.4		-0.71					
Autoclave	5		L					Tr	0	5.4													
Autoclave	6		L					Tr	0	5.4													
TOTAL									**0**	**10.8**	Covered under Clean Hold and Clean Prep.			No	-0.18					-0.18			
Mist Booth	8	H				O			**25.2**	**0**	**2.7**	8	1.296	No	-0.40	-147.6		-0.40					
Water Treatment	7		L					Tr	0	5.4													
	8		L				Tu		0	0													
	9		L				Tu		0	0													
	12		L				Tu		0	0													
	15		L				Tu		0	0													
	16		L				Tu		0	0													
	20		L					Tr	0	5.4													
	New		L				Tu		0	0													
	New		L				Tu		0	0													
	New		L				Tu		0	0													
	Unmarked		L				Tu		0	0													
TOTAL									**0**	**10.8**	**81**	8	38.88	Yes	0.47	5.8				0.468			
Mist Booth	9	H				O			**25.2**	**0**	**2.7**	8	1.296	No	-0.40	-147.6		-0.40					
Equipment Wash	10	H			C				**0**	**0**	**52**	8	24.96	Yes	0.42	8		0.42					
Tech Area 2	10	H			C				0	0													
	11	H			C				0	0													
	XX		L					Tr	0	5.4													
TOTAL									**0**	**5.4**	**21**	8	10.08	Yes	0.078	3.7				0.078			
Formulation	13	H			C				0	0													
	15	H			C				0	0													
	16	H			C				0	0													
	17	H				O			25.2	0													
TOTAL									**25.2**	**0**	**73**	8	35.04	Yes	0.16	2.25		0.16					
Mist area	18	H				O			**25.2**	**0**	**2.7**	8	1.296	No	-0.40	-147.6		-0.40					
Mist area	19	H				O			**25.2**	**0**	**2.7**	8	1.296	No	-0.4	-147.6			-0.4				
Clean Prep			L	P					**0**	**63**	**61**	8	29.28	No	-0.56	-9.2				-0.562			
Fill Room	22	H		P					63	0													
Fill Room	23	H			C				0	0													
Fill Room	24	H			C				0	0													
Fill Room	25	H			C				0	0													
Fill Room (New pop up)	26	H		P					63	0													
Fill Room	XX	H			C				0	0													
Fill Room	XX	H			C				0	0													
Fill Room	XX	H			C				0	0													
Fill Room	XX		L		C				0	0													
Fill Room	XX		L		C				0	0													
Fill Room (WFI Sample)			L					Tr	0	5.4													
TOTAL									**126**	**5.4**	**284.00**	8	136.32	Yes	0.08	0.29			0.17	-0.09			

Comparison of drainage available vrs potential incoming Firewater

Room	PrD	Strength		Type					Flow to drain when sprinkler is activated (m^3/hr)		Flow from the sprinkler system to room(s)			Drain Flow <= Sprinkler Flow	Water hold up per minute in the room		Water hold up (m^3/min) is associated with:				
		High	Low	Pop Up	Closed	Open	Tundish	Trench	High Strength	Low Strength	Area (m^2)	Density (mm/min)	Flowrate (m^3/hr)		m^3	mm	Lyo	Con/Form	Fill	Low	Inspection
Controlled Corridor 3	XX	H		P					63	0											
Inspection Room + Mist booth		H		P					63	0											
Inspection Room + Mist booth (new)		H		P					63	0											
Total									189		**154.7**	8	74.256	No	-1.9124	-12.36					-1.9124
Utilities area	25		L				Tu		0	0											
Utilities area	26		L		C				0	0											
Utilities area	30		L		C				0	0											
Utilities area	XX		L				Tu		0	0											
Utilities area	XX		L				Tu		0	0											
Utilities area	XX	H			C				0	0											
TOTAL									**0**	**0**	**81**	8	38.88	Yes	0.648	8				0.648	
								ew													
Lyo Mech Unclassified	27		L		C				0	0											
Lyo Mech Unclassified	28	H			C				0	0											
Lyo Mech Unclassified	29	H			C				0	0											
Lyo Mech Unclassified (New pop up)	30	H		P		Old Open			63	0											
Lyo Mech Unclassified (New pop up)	31	H		P		Old Open			63	0											
Lyo Mech Unclassified	XX	H			C				0	0											
Lyo Mech Unclassified	XX		L				Tu		0	0											
Total									**126**	**0**	**75.2**	8	36.096	No	-1.50	-19.93	-1.50				
Associated mist booth	32	H				O			**25.2**	**0**	**2.7**	8	1.296	No	-0.40	-147.56	-0.40				
Clean Hold	XX	H		P					**63**	**0**	**25**	8	12	No	-0.85	-34			-0.85		
LYO (Future)	28		L		C				0	0											
LYO (Future)	33	H			C				0	0											
LYO (Future)	34	H			C				0	0											
LYO (Future)	36	H				O			25.2	0											
LYO (Future)	37	H			C				0	0											
LYO (Future)	XX		L		C				0	0											
LYO (hepa area)	XX	H			C				0	0											
TOTAL									**25.2**	**0**	**66**	8	31.68	Yes	0.11	1.64	0.11				
Boiler Room	NONE								**0**	**0**	**0**	0	0	0	0	0					
Janitor's closet	43	H			C				**0**	**0**	**6**	8	2.88	Yes	0.05	8		0.05			
Downflow booth	XX		L		C				**0**		Condensate Drain only										
Controlled Corridor 1	XX	H		P					63	0											
Controlled Corridor 1	XX	H		P					63	0											
TOTAL									**126**	**0**	**46**	8	22.08	No	-1.73	-37.7		-1.73			
Controlled Corridor 2	XX	H		P					**63**	**0**	**148**	8	71.04	Yes	0.13	0.9		0.13			
ADC RECEIVING / INSPECTION AREA											69	8	33.12	Yes	0.55	8.0					
CHANGE / FORMAT PARTS											9	8	4.32	Yes	0.07	8.0				0.55	
SECURE STORAGE (CAGED)		H			C				**5.4**	**0**											
SECURE STORAGE (CAGED)		H		P					**68.4**	**0**	14	8	6.72	No	-1.03	-73.4				0.07	
																				-1.03	
Shrink Wrap Room		H		P					**126**	**0**	69	8	33.12	No	-1.55	-22.4					-1.548

TOTALS									**995.4**	**95.4**	**1468.4**	m^2	**704.8**	m^3/hr	**-6.433**	mm	-1.789	-2.017	-1.076	0.362	-1.912	-0.404	-1.548
High Strength areas											1238.4	m^2	594.4	m^3/hr	-7.823	mm							
- Lyo areas									176.4	m^3/hr	143.9	m^2	69.1	m^3/hr	-1.789	mm							
- Conj/Buffer/Form areas									415.80	m^3/hr	614.1	m^2	294.8	m^3/hr	-2.017	mm							
- Fill Line areas									214.2	m^3/hr	311.7	m^2	149.6	m^3/hr	-1.076	mm							
- Inspection areas									189.0	m^3/hr	154.7	m^2	74.3	m^3/hr	-1.912	mm							
- Storage room									68.4	m^3/hr	14	m^2	6.7	m^3/hr	-1.028	mm							
Shrink wrap room									126.0	m^3/hr	69	m^2	33.1	m^3/hr	-1.548	mm							
Low Strength areas										95.4	244.0	m^2	117.1	m^3/hr	0.362	mm							

Comparison of drainage available vrs potential incoming Firewater

Notes 1

Flowrate from pop ups =	17.5	l/sec =	63.0	m^3/hr
Flowrate from fixed drains =	7	l/sec =	25.2	m^3/hr
Flowrate from channel =	1.5	l/sec =	5.4	m^3/hr

0.455006396

2 [redacted] => repeat of tag number

3 Drains that are designated as closed are not included in firewater dainage capability.

4 Labs and the Warehouse were not included in the calculation as they will not contain OEB5 material.

Table 9.2 Summary of potential water holdup andrecommended curb/lip height.

Designation	Water hold up if 100% sprinklers operational (m^3/min)	Sprinkler Water in (m^3/min)	Potential Drainage Flow (m^3/min)	Sprinkler Diversity Factor	Water Hydrant (1) (m^3/min)	Fire Duration (mins)	% Evaporated	Water hold up (m^3)	Likely Hold up of liquid (mm) (+ive = holdup, -ive = spare drain capacity)
All Strong Wastewater areas	-7.823	9.907	16.590	90%	2.1	60	10%	-401	-273
Lyophiliser	-1.789	1.151	2.940	90%	1.05	60	10%	-64	-443
Conjugation / Formulation	-2.017	4.913	6.930	90%	1.05	60	10%	-120	-196
Inspection Room	-1.912	1.238	3.150	90%	1.05	60	10%	-72	-466
Storage room	-0.404	0.112	1.140	90%	1.05	60	10%	-6	-447
Shrink Wrap room	-1.548	0.552	2.100	90%	1.05	60	10%	-42	-616
Fill Line	-1.076	2.494	3.570	90%	1.05	60	10%	-36	-116

Therefore, subject to Structural limitations it is recommended that the minimum curb depth for a flat (*) floor is:

None required mm

Rounded up to the nearest obvious depth =

0 mm

It should be noted that for all areas designated above that "N+1" number of pop-up drains are alloed per area i.e. if one pop-up drain fails to operate there is still ample drainage capacity for that area.

Floor Tolerance

(*) The floor is not absolutely flat

Drain should be at low point but that is not necessarily the case.

Tolerance =

6.50 mm per 3m (per FM2 class)

10.00 mm between any points on the floor

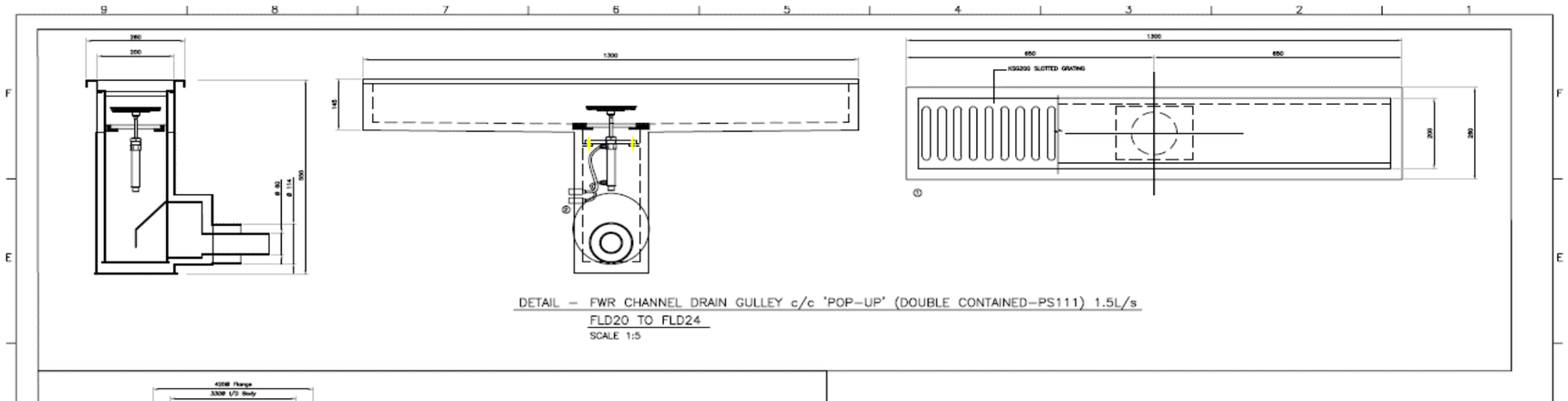
15.00 mm = max height of floor under the door differential to the rest of the floor to still be "Flat" per Part M of the Irish Building Regulations.

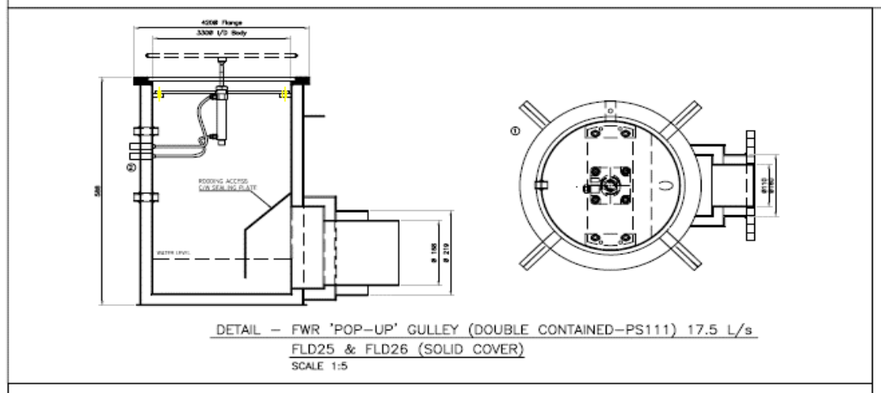
2 extreme scenarios;

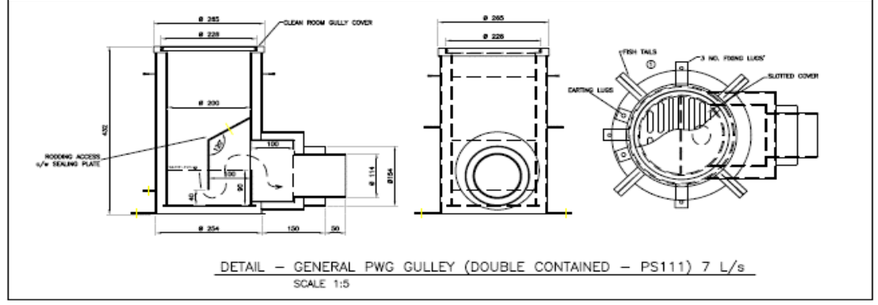
1: Drains at low points - No issue drains will not allow a build up of water before exiting the room in question via the doors

2: Drains are at higher points in the floor than the door.floor point. Max floor differential = 10mm, door bottom raised by 15mm => 5 mm to spare to allow the drains (excess capacity) to activate fully.

Comparison of drainage available vrs potential incoming Firewater







NOTES

GENERAL NOTES:

A. THIS DRAWING TO BE READ IN CONJUNCTION WITH ASSOCIATED DRAINAGE DRAWINGS & SPECIFICATIONS.

B. CONTRACTOR TO VERIFY ALL DIMENSIONAL DETAILS.

C. CONTRACTOR TO PROVIDE CONDUIT TO FACILITATE AIR TUBING TO ALL 'POP-UP' DRAIN PNEUMATIC ACTUATORS. 25 CONDUIT TO BE FITTED TO GULLEY & ROUTED IN SCREWED SECTIONS TO LOCATION WITHIN CLEAN ROOM WALL.

D. GULLEYS AS PER RTC/KENT STAINLESS OR OWNER APPROVED EQUAL. GULLEY MATERIAL SPECIFICATION TO BE EQUAL TO PIPING SPEC PS111.

E. CONTRACTOR TO CO-ORDINATE RADON BARRIER REQUIREMENTS WITH DRAINAGE INSTALLATION.

F. CONTRACTOR TO CO-ORDINATE ELEVATION OF TOP OF FLOOR DRAIN TO TOP OF FLOOR FINISH REQUIREMENTS.

G. ALL COVERS TO BE RATED TO FACTA CLASS AAA.

H. REFER TO ARCHITECTS FINISHES SCHEDULE DOCUMENT 7A/A.03A/002.

SHEET NOTES:

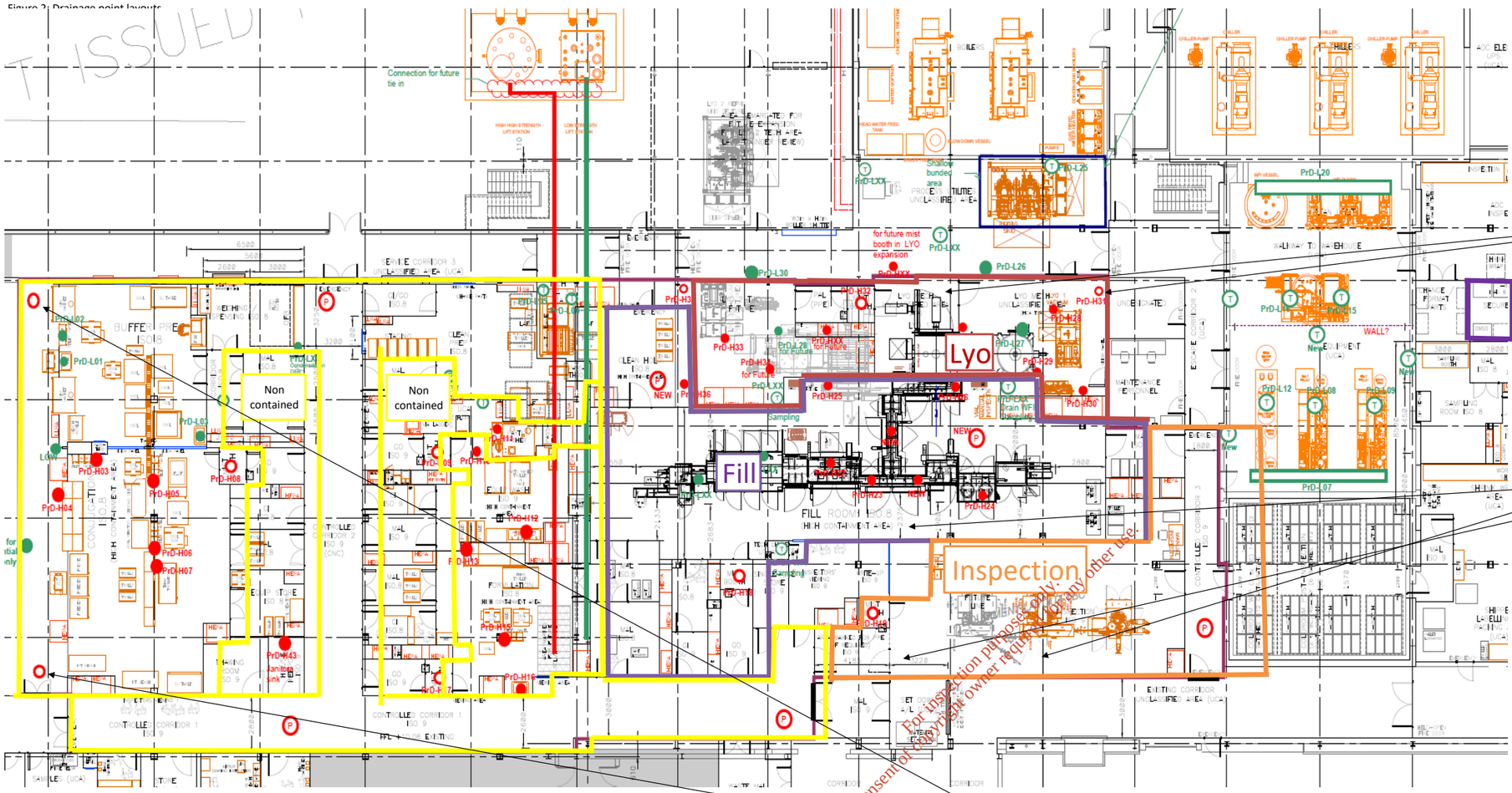
① CONTRACTOR SHALL SUBMIT INSTALLATION DETAILS OF PROPOSED FLOOR DRAIN GULLY/ACCESS COVER INTERFACE WITH FINISHED FLOOR LEVEL. THIS REQUIREMENT FOR EACH GULLEY/COVER & INCLUDE METHOD STATEMENT. INSTALLATION & METHOD MUST ENSURE A FLAT FLOOR FINISH & WHETHER AN EPOXY OR VINYL FLOOR FINISH IS UTILISED.

② CONTRACTOR SHALL DESIGN 'POP-UP' FLOOR GULLEY THAT CONDAT CONNECTIONS ARE WATER SEALED & ALSO CONTRACTION MUST ENSURE THAT TUBING CAN EASILY BE REPLACED IN EVENT OF FAILURE.

PROJECT NO.	380–0078 A1
	Elanco Animal Health Ireland
	Drainage Details
	Sheet 2 of 2
DESIGNED	MS
DRAWN	TMcK
CHECKED	N/A
	IS1–M03–06–0002 0

Comparison of drainage available vrs potential incoming Firewater

Figure 2: Drainage point layouts



Comparison of drainage available vrs potential incoming Firewater