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Document name: 19310-EDGE-XX-XX-CO-C-0002_LLFA RESPONSE[P01]

24 May 2024

Ian Sandiford
Persimmon House
Lancaster Business Park
Caton Road
Lancaster
LA1 3RQ

Dear Ian,

Re: 19310 – Hawthorne Farm, Clitheroe – LLFA response

With regards to the comments received form the LLFA, quoted below, concerning the drainage proposals and specifically discharge of condition 9 of planning decision 3/2019/1104, EDGE provide this letter and accompanying drawing and calculations in response to the comment.

LLFA comment

"Lead Local Flood Authority Position The Lead Local Flood Authority is currently unable to recommend the discharge of condition 9 on planning decision 3/2019/1104 on the basis of:

• The applicant has failed to provide evidence of how the proposed filter drain along the southern and eastern boundary has been designed, in order to demonstrate that the proposed drain will not increase flood risk or increase the overall discharge rate from the development given its proposal to connect to diverted culverted watercourse."

EDGE have calculated the greenfield rate that the area of gardens draining to the 2 land drains generate. Gardens totalling 1,290m^2 drain to the land drains and the attached document "GARDEN gf.pdf" shows this area generates a QBAR peak greenfield runoff rate of 0.8 l/s.

EDGE have deducted this amount from the proposed hydro-brake which is now designed to discharge a maximum of 10.9 l/s. Therefore, the gross runoff rate (from both the hydro-brake and the land drains) does not exceed the approved greenfield runoff rate for the site (11.7 l/s).

Attached calculations provided show rates for the 1, 2, 30 and 100 year + climate change simulations.

Extracts are shown below of each return periods critical storm simulation with the maximum runoff from the hydro brake highlighted in red.

1 YEAR

1 year return period Critical Summary of Results by Maximum Level (Rank 1)

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Infiltration Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
1.000	SW1	15 minute 1 year Winter I+0%	81.745	80.432	-0.113	0.000	0.48		0.153	8.237	0.9	17.3	OK
1.001	SW2	15 minute 1 year Winter I+0%	81.819	80.267	-0.167	0.000	0.40		0.240	13.213	0.9	25.9	OK
1.002	SW3	15 minute 1 year Winter I+0%	81.712	80.131	-0.156	0.000	0.46		0.706	21.222	1.2	39.4	OK
1.003	SW4	15 minute 1 year Winter I+0%	81.234	79.800	-0.234	0.000	0.30		0.270	23.684	1.1	43.3	OK
2.000	SW15	15 minute 1 year Winter I+0%	80.809	79.661	-0.272	0.000	0.12		0.174	5.663	0.5	11.6	OK
1.004	SW5	15 minute 1 year Winter I+0%	81.085	79.624	-0.230	0.000	0.48		1.478	38.389	0.9	67.3	OK
1.005	SW6	15 minute 1 year Winter I+0%	81.222	79.475	-0.288	0.000	0.42		1.922	41.827	0.8	71.2	OK
3.000	SW16	15 minute 1 year Winter I+0%	80.628	79.423	-0.379	0.000	0.06		0.228	3.889	0.5	8.3	OK
1.006	SW7	15 minute 1 year Winter I+0%	81.043	79.313	-0.406	0.000	0.12		0.869	47.038	2.2	79.0	OK
1.007	SW8hwall	240 minute 1 year Winter I+0%	81.924	78.879	-0.046	0.000	0.10		2.565	146.448	0.6	24.9	OK
1.008	SW9hwall	240 minute 1 year Winter I+0%	81.924	78.877	-0.173	0.000	0.07		3.721	146.045	0.3	24.2	OK
1.009	S10 HYDROBRAI	240 minute 1 year Winter I+0%	81.000	78.877	-0.148	0.000	0.03		92.994	166.920	0.2	10.5	OK
4.000	CUL1	15 minute 1 year Summer I+0%	81.000	79.496	-0.465	0.000	0.15		0.331	97.989	1.2	50.9	OK
4.001	CUL2	15 minute 1 year Summer I+0%	81.200	79.382	-0.468	0.000	0.11		0.598	97.455	1.2	49.7	OK
4.002	CUL3	15 minute 1 year Summer I+0%	81.200	79.207	-0.452	0.000	0.16		0.813	96.847	1.0	51.5	OK
4.003	CUL4	15 minute 1 year Summer I+0%	81.250	79.135	-0.461	0.000	0.15		0.567	96.325	1.1	50.1	OK
4.004	SW17	15 minute 1 year Summer I+0%	80.500	78.497	-0.583	0.000	0.10		0.413	95.293	0.7	49.3	OK
1.010	SW11	15 minute 1 year Summer I+0%	80.800	78.402	-0.588	0.000	0.10		2.022	113.911	0.7	44.1	OK
1.011	SW12	60 minute 1 year Winter I+0%	80.135	78.342	-0.593	0.000	0.09		0.978	242.168	0.6	42.9	OK
1.012	SW13	60 minute 1 year Winter I+0%	80.025	78.224	-0.601	0.000	0.09		1.577	240.655	0.7	42.8	OK

Storm Selector
600 minute 1 year Summer I+0%

2 YEAR

2 year return period Critical Summary of Results by Maximum Level (Rank 1)

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Infiltration Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
1.000	SW1	15 minute 2 year Winter I+0%	81.745	80.451	-0.094	0.000	0.62		0.180	10.658	1.0	22.4	OK
1.001	SW2	15 minute 2 year Winter I+0%	81.819	80.289	-0.145	0.000	0.51		0.312	17.097	0.9	33.6	OK
1.002	SW3	15 minute 2 year Winter I+0%	81.712	80.155	-0.132	0.000	0.59		0.936	27.460	1.3	51.0	OK
1.003	SW4	15 minute 2 year Winter I+0%	81.234	79.823	-0.211	0.000	0.39		0.345	30.643	1.2	56.2	OK
2.000	SW15	15 minute 2 year Winter I+0%	80.809	79.687	-0.246	0.000	0.15		0.220	7.328	0.6	14.8	OK
1.004	SW5	15 minute 2 year Winter I+0%	81.085	79.662	-0.192	0.000	0.62		2.148	49.669	0.9	86.9	OK
1.005	SW6	15 minute 2 year Winter I+0%	81.222	79.514	-0.249	0.000	0.54		2.594	54.113	0.8	91.8	OK
3.000	SW16	15 minute 2 year Winter I+0%	80.628	79.435	-0.367	0.000	0.08		0.269	5.033	0.5	10.7	OK
1.006	SW7	15 minute 2 year Winter I+0%	81.043	79.329	-0.390	0.000	0.15		1.140	60.855	2.3	101.4	OK
1.007	SW8hwall	240 minute 2 year Winter I+0%	81.924	79.007	0.082	0.000	0.12		3.392	178.379	0.6	30.3	SURCHARGED
1.008	SW9hwall	240 minute 2 year Winter I+0%	81.924	79.006	-0.044	0.000	0.09		4.334	177.862	0.3	29.4	OK
1.009	S10 HYDROBRAI	240 minute 2 year Winter I+0%	81.000	79.005	-0.020	0.000	0.03		120.502	202.192	0.3	10.6	OK
4.000	CUL1	15 minute 2 year Summer I+0%	81.000	79.507	-0.454	0.000	0.17		0.360	100.091	1.2	58.5	OK
4.001	CUL2	15 minute 2 year Summer I+0%	81.200	79.392	-0.458	0.000	0.13		0.677	99.557	1.3	56.6	OK
4.002	CUL3	15 minute 2 year Summer I+0%	81.200	79.220	-0.439	0.000	0.18		0.935	98.949	1.0	59.2	OK
4.003	CUL4	15 minute 2 year Summer I+0%	81.250	79.147	-0.449	0.000	0.17		0.640	98.427	1.1	57.5	OK
4.004	SW17	15 minute 2 year Summer I+0%	80.500	78.509	-0.571	0.000	0.11		0.442	97.389	0.7	56.2	OK
1.010	SW11	15 minute 2 year Summer I+0%	80.800	78.413	-0.577	0.000	0.11		2.265	120.512	0.7	50.5	OK
1.011	SW12	15 minute 2 year Winter I+0%	80.135	78.350	-0.585	0.000	0.10		1.067	120.532	0.7	48.1	OK
1.012	SW13	30 minute 2 year Summer I+0%	80.025	78.232	-0.593	0.000	0.10		1.739	118.399	0.7	48.0	OK

Storm Selector
15 minute 2 year Summer I+0%

30 YEAR

30 year return period Critical Summary of Results by Maximum Level (Rank 1)

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Infiltration Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
1.000	SW1	15 minute 30 year Winter I+0%	81.745	80.627	0.082	0.000	1.11		0.432	20.154	1.0	39.8	SURCHARGED
1.001	SW2	15 minute 30 year Winter I+0%	81.819	80.489	0.055	0.000	0.95		1.115	32.330	1.0	61.9	SURCHARGED
1.002	SW3	15 minute 30 year Winter I+0%	81.712	80.352	0.065	0.000	1.12		2.750	51.925	1.4	96.9	SURCHARGED
1.003	SW4	15 minute 30 year Winter I+0%	81.234	79.973	-0.061	0.000	0.75		1.295	57.942	1.4	106.5	OK
2.000	SW15	15 minute 30 year Winter I+0%	80.809	79.892	-0.041	0.000	0.28		0.581	13.860	0.5	26.6	OK
1.004	SW5	15 minute 30 year Winter I+0%	81.085	79.874	0.020	0.000	1.17		5.917	93.922	1.0	164.7	SURCHARGED
1.005	SW6	15 minute 30 year Winter I+0%	81.222	79.675	-0.088	0.000	1.00		5.523	102.323	0.9	170.6	OK
3.000	SW16	240 minute 30 year Winter I+0%	80.628	79.527	-0.275	0.000	0.03		0.589	26.843	0.4	4.7	OK
1.006	SW7	240 minute 30 year Winter I+0%	81.043	79.527	-0.192	0.000	0.08		5.552	324.124	2.0	56.7	OK
1.007	SW8hwall	240 minute 30 year Winter I+0%	81.924	79.526	0.601	0.000	0.22		6.556	320.632	0.6	55.2	SURCHARGED
1.008	SW9hwall	240 minute 30 year Winter I+0%	81.924	79.525	0.475	0.000	0.16		6.681	316.256	0.4	54.2	SURCHARGED
1.009	S10 HYDROBRAI	240 minute 30 year Winter I+0%	81.000	79.524	0.499	0.000	0.03		260.265	256.513	0.3	10.6	SURCHARGED
4.000	CUL1	15 minute 30 year Summer I+0%	81.000	79.549	-0.412	0.000	0.26		0.465	108.335	1.3	88.2	OK
4.001	CUL2	15 minute 30 year Summer I+0%	81.200	79.432	-0.418	0.000	0.19		0.974	107.801	1.4	83.9	OK
4.002	CUL3	15 minute 30 year Summer I+0%	81.200	79.266	-0.393	0.000	0.27		1.366	107.193	1.1	89.6	OK
4.003	CUL4	15 minute 30 year Summer I+0%	81.250	79.189	-0.407	0.000	0.26		0.891	106.671	1.1	87.6	OK
4.004	SW17	15 minute 30 year Summer I+0%	80.500	78.552	-0.528	0.000	0.17		0.553	105.629	0.8	83.1	OK
1.010	SW11	15 minute 30 year Summer I+0%	80.800	78.454	-0.536	0.000	0.17		3.285	133.805	0.8	76.2	OK
1.011	SW12	15 minute 30 year Summer I+0%	80.135	78.387	-0.548	0.000	0.14		1.457	131.495	0.8	72.3	OK
1.012	SW13	15 minute 30 year Summer I+0%	80.025	78.266	-0.559	0.000	0.15		2.455	129.933	0.8	72.6	OK

Storm Selector

60 minute 30 year Summer I+0%

100 YEAR + CLIMATE CHANGE

100 year return period Critical Summary of Results by Maximum Level (Rank 1)

Pipe Number	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Infiltration Vol (m³)	Maximum Vol (m³)	Discharge Vol (m³)	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
1.000	SW1	15 minute 100 year Winter I+45%	81.745	81.748	1.203	3.085	2.15		5.118	37.754	2.0	77.4	FLOOD
1.001	SW2	15 minute 100 year Winter I+45%	81.819	81.609	1.175	0.000	1.48		2.789	60.563	1.4	96.5	FLOOD RISK
1.002	SW3	15 minute 100 year Winter I+45%	81.712	81.359	1.072	0.000	1.77		4.411	97.263	2.2	152.1	SURCHARGED
1.003	SW4	15 minute 100 year Winter I+45%	81.234	80.541	0.507	0.000	1.21		3.677	108.532	1.5	172.0	SURCHARGED
2.000	SW15	480 minute 100 year Winter I+45%	80.809	80.312	0.379	0.000	0.08		1.324	88.484	0.5	7.5	SURCHARGED
1.004	SW5	480 minute 100 year Winter I+45%	81.085	80.311	0.457	0.000	0.35		7.723	599.242	0.8	49.8	SURCHARGED
1.005	SW6	480 minute 100 year Winter I+45%	81.222	80.308	0.545	0.000	0.30		9.210	647.212	0.7	51.5	SURCHARGED
3.000	SW16	480 minute 100 year Winter I+45%	80.628	80.305	0.503	0.000	0.03		3.285	59.569	0.5	4.7	SURCHARGED
1.006	SW7	480 minute 100 year Winter I+45%	81.043	80.306	0.587	0.000	0.08		13.373	717.692	1.9	55.5	SURCHARGED
1.007	SW8hwall	480 minute 100 year Winter I+45%	81.924	80.304	1.379	0.000	0.22		10.155	710.283	0.6	54.7	SURCHARGED
1.008	SW9hwall	480 minute 100 year Winter I+45%	81.924	80.303	1.253	0.000	0.16		10.202	702.862	0.3	53.9	SURCHARGED
1.009	S10 HYDROBRAI	480 minute 100 year Winter I+45%	81.000	80.302	1.277	0.000	0.03		575.571	543.702	0.3	10.6	SURCHARGED
4.000	CUL1	15 minute 100 year Summer I+45%	81.000	79.610	-0.351	0.000	0.43		0.621	123.610	1.4	143.8	OK
4.001	CUL2	15 minute 100 year Summer I+45%	81.200	79.489	-0.361	0.000	0.31		1.471	123.076	1.5	133.3	OK
4.002	CUL3	15 minute 100 year Summer I+45%	81.200	79.337	-0.322	0.000	0.44		2.365	122.467	1.2	144.4	OK
4.003	CUL4	15 minute 100 year Summer I+45%	81.250	79.260	-0.336	0.000	0.42		1.422	121.945	1.2	139.2	OK
4.004	SW17	15 minute 100 year Summer I+45%	80.500	78.612	-0.468	0.000	0.27		0.704	120.903	1.0	133.8	OK
1.010	SW11	15 minute 100 year Summer I+45%	80.800	78.517	-0.473	0.000	0.28		5.378	150.089	0.9	124.1	OK
1.011	SW12	15 minute 100 year Summer I+45%	80.135	78.442	-0.493	0.000	0.23		2.248	147.769	0.9	115.2	OK
1.012	SW13	15 minute 100 year Summer I+45%	80.025	78.319	-0.506	0.000	0.23		3.923	146.203	0.9	114.4	OK

Storm Selector

15 minute 100 year Summer I+45%

This shows that greenfield rates are not exceeded, and flood risk is appropriately managed.

[redacted]

[redacted]

Team Leader - Civil