

APPLICANT: MR. PEARSE McKIERNAN

PROPOSED DWELLING-HOUSE AT REDGAP, RATHCOOLE, CO.DUBLIN

SURFACE WATER DRAINAGE REPORT

PATRICK JOYCE ASSOCIATES

CONSULTING ENGINEERS

2 PROSPECT GROVE

STOCKING LANE,

RATHFARNHAM,

DUBLIN 16.

SEPTEMBER 2022

**PATRICK JOYCE ASSOCIATES**  
Consulting Engineers

---

2 Prospect Grove,  
Stocking Lane,  
Rathfarnham,  
Dublin 16

Tel: (01) 4946745  
Mobile: 087 2476375

Email: patrickjoyceassociates@gmail.com

PATRICK C. JOYCE BE, MBA, C.Eng., MIEI

---

APPLICANT: MR. PEARSE McKIERNAN

PROPOSED DWELLING-HOUSE AT REDGAP, RATHCOOLE, CO. DUBLIN

SURFACE WATER DRAINAGE REPORT

Introduction:

The proposed development consists of detached split level dwelling-house at Redgap, Rathcoole, Co. Dublin.

It is proposed to discharge the rainwater from the dwelling-house roofs to a stone filled soakaway located as shown on the attached Drainage Layout Plan. It is also proposed to incorporate rainwater harvesting facilities in the system.

The entrance driveway and paved areas shall be constructed using permeable paving or compacted crushed stone/gravel material.

Dwelling-house Contributing Area:

The surface water run-off contributing area for the roof of the dwelling-house is calculated as follows:

|           |              |                      |
|-----------|--------------|----------------------|
| Roof (1): | 21.8 x 6.3 = | 137.3 m <sup>2</sup> |
| Roof (2): | 6.2 x 5.0 =  | 31.0 m <sup>2</sup>  |
| Roof (3): | 18.7 x 6.2 = | 115.9 m <sup>2</sup> |
|           |              | -----                |
| Total:    |              | 284.2 m <sup>2</sup> |

Design Soakaway with contributing area of 285 m<sup>2</sup>.

The soakaway shall be constructed strictly in accordance with the requirements of BRE Digest 365.

Surface Water - Infiltration Rate:

The applicant excavated a trial pit on the site to facilitate the carrying out of a soil infiltration test. There was no ground water present in the trial pit and the soil infiltration rate was determined to be  $5.50 \times 10^{-5}$  m/s.

Soakaway Design:

Refer to BRE Digest 365 in respect of design of the soakaway.

Design soakaway with contributing area of 285 m<sup>2</sup>.

The soil infiltration rate has been taken at  $5.50 \times 10^{-5}$  m/s.

The return period rainfall depths for the site were obtained from Met Eireann Model – refer copy attached.

A 15% allowance for climate change factor was added to the rainfall depths as shown.

Assume soakaway with plan dimensions of 5.0 m x 5.0 m and with 0.90 m effective depth and containing 30% free volume.

The internal surface area of the soakaway to 50% of storage depth excluding base = 9.00 m<sup>2</sup>.

Effective volume of the proposed soakaway = 6.75 m<sup>3</sup>

| <u>Storm Duration</u><br>(Mins) | <u>Rainfall</u><br>(mm) | <u>Rainfall +15%</u><br>(mm) | <u>Total</u><br><u>Quantity</u><br>(m <sup>3</sup> ) | <u>Outflow</u><br><u>Quantity</u><br>(m <sup>3</sup> ) | <u>Storage</u><br><u>Quantity</u><br>(m <sup>3</sup> ) |
|---------------------------------|-------------------------|------------------------------|--|--|--|
| 5                               | 7.9                     | 9.1                          | 2.60   | 0.15   | 2.45   |
| 10                              | 11.0                    | 12.6                         | 3.59   | 0.30   | 3.29   |
| 15                              | 12.9                    | 14.8                         | 4.21   | 0.45   | 3.76   |
| 30                              | 17.2                    | 19.8                         | 5.64   | 0.89   | 4.75   |
| 60                              | 23.0                    | 26.4                         | 7.52   | 1.78   | 5.74   |
| 120                             | 30.7                    | 35.3                         | 10.06  | 3.56   | 6.50   |
| 180                             | 36.4                    | 41.9                         | 11.94  | 5.35   | 6.59 *   |
| 240                             | 41.0                    | 47.1                         | 13.43  | 7.13   | 6.30   |
| 360                             | 48.6                    | 55.9                         | 15.93  | 10.69  | 5.24   |
| 540                             | 57.6                    | 66.2                         | 18.87  | 16.04  | 2.83   |
| 720                             | 65.0                    | 74.7                         | 21.29  | 21.38  | ----   |

Maximum storage required = 6.59 m<sup>3</sup> (i.e. less than the effective volume of the soakaway of 6.75 m<sup>3</sup>).

Hence, soakaway with plan dimensions of 5.0 m x 5.0 m with 0.90 m effective depth and containing 30% free volume is satisfactory.

Rainwater Harvesting Facilities:

It is proposed to incorporate rainwater harvesting facilities on the rainwater drainage system which will be used to supply grey water for the dwelling-house i.e. for toilets etc. This water shall also be used for maintenance and gardening purposes,

It is proposed to incorporate an underground rainwater harvesting tank with 4,500 litre capacity. In addition, it is proposed to incorporate 2 No. 200 litre water butts. The location of the rainwater harvesting tank and the water butts are shown on the attached Drainage Layout Plan.

A Sedum (or equivalent) type green roof shall be provided on the interconnecting section of the proposed dwelling-house (32.5 m<sup>2</sup>).

General:

The soakaway shall be constructed strictly in accordance with the requirements of BRE Digest 365. A geotextile membrane shall be fitted around the sides and top of the granular fill in the soakaway. An inspection well with suitable access cover shall be incorporated into the soakaway. A cross section of the proposed soakaway is shown on Drawing No. D-2213-02.

The soakaway shall be located where shown on the attached Drainage Layout Plan. The proposed soakaway shall be located circa 8.5 metres from the north western site boundary and shall be located circa 8.1 metres from the proposed dwelling-house.

Technical Details - Levels:

|                                      |          |
|--------------------------------------|----------|
| Dwelling-house Finished Floor Level: | 264.10 m |
| Existing Ground Level at Soakaway:   | 261.50 m |
| Bottom of Soakaway Fill:             | 260.00 m |
| Top of Soakaway Granular Fill:       | 260.90 m |

PROPOSED SITE AT REDRAP, RATHCOOLE

Met Eireann  
Return Period Rainfall Depths for sliding Durations  
Irish Grid: Easting: 301591, Northing: 224586,

| DURATION | Years                       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|----------|-----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|          | Interval<br>6months, 1year, | 2,     | 3,     | 4,     | 5,     | 10,    | 20,    | 30,    | 50,    | 75,    | 100,   | 150,   | 200,   | 250,   | 500,   |
| 5 mins   | 2.7,                        | 4.4,   | 5.2,   | 5.9,   | 6.3,   | 7.9,   | 9.6,   | 10.8,  | 12.4,  | 13.9,  | 15.0,  | 16.8,  | 18.2,  | 19.3,  | N/A,   |
| 10 mins  | 3.7,                        | 6.1,   | 7.3,   | 8.2,   | 8.8,   | 11.0,  | 13.4,  | 15.1,  | 17.3,  | 19.4,  | 21.0,  | 23.4,  | 25.3,  | 26.9,  | N/A,   |
| 15 mins  | 4.4,                        | 7.1,   | 8.6,   | 9.6,   | 10.4,  | 12.9,  | 15.8,  | 17.7,  | 20.4,  | 22.8,  | 24.7,  | 27.5,  | 29.8,  | 31.6,  | N/A,   |
| 30 mins  | 5.8,                        | 9.5,   | 11.5,  | 12.8,  | 13.9,  | 17.2,  | 21.1,  | 23.6,  | 27.2,  | 30.4,  | 32.8,  | 36.7,  | 39.6,  | 42.1,  | N/A,   |
| 1 hours  | 7.8,                        | 12.8,  | 15.4,  | 17.1,  | 18.5,  | 23.0,  | 28.1,  | 31.5,  | 36.2,  | 40.5,  | 43.7,  | 48.8,  | 52.7,  | 56.0,  | N/A,   |
| 2 hours  | 10.5,                       | 17.1,  | 20.6,  | 22.9,  | 24.8,  | 30.7,  | 37.5,  | 42.0,  | 48.3,  | 53.9,  | 58.3,  | 65.0,  | 70.2,  | 74.5,  | N/A,   |
| 3 hours  | 12.5,                       | 20.3,  | 24.4,  | 27.2,  | 29.3,  | 36.4,  | 44.4,  | 49.7,  | 57.1,  | 63.8,  | 68.9,  | 76.8,  | 83.0,  | 88.1,  | N/A,   |
| 4 hours  | 14.1,                       | 22.9,  | 27.5,  | 30.7,  | 33.1,  | 41.0,  | 50.1,  | 56.0,  | 64.4,  | 71.8,  | 77.6,  | 86.5,  | 93.4,  | 99.2,  | N/A,   |
| 6 hours  | 16.7,                       | 27.2,  | 32.6,  | 36.3,  | 39.2,  | 48.6,  | 59.3,  | 66.3,  | 76.2,  | 85.0,  | 91.8,  | 102.3, | 110.5, | 117.2, | N/A,   |
| 9 hours  | 19.9,                       | 32.2,  | 38.7,  | 43.1,  | 46.5,  | 57.6,  | 70.2,  | 78.5,  | 90.2,  | 100.6, | 108.6, | 121.0, | 130.6, | 138.6, | N/A,   |
| 12 hours | 22.4,                       | 36.4,  | 43.7,  | 48.6,  | 52.5,  | 65.0,  | 79.1,  | 88.5,  | 101.6, | 113.3, | 122.3, | 136.3, | 147.1, | 156.1, | N/A,   |
| 18 hours | 26.6,                       | 43.2,  | 51.8,  | 57.6,  | 62.2,  | 77.0,  | 93.7,  | 104.8, | 120.3, | 134.1, | 144.7, | 161.2, | 173.9, | 184.5, | N/A,   |
| 24 hours | 30.1,                       | 48.7,  | 58.5,  | 65.0,  | 70.2,  | 86.8,  | 105.7, | 118.1, | 135.6, | 151.1, | 163.1, | 181.6, | 195.9, | 207.8, | 249.5, |
| 2 days   | 37.9,                       | 58.8,  | 69.5,  | 76.5,  | 82.0,  | 99.6,  | 119.1, | 131.8, | 149.4, | 164.9, | 176.9, | 195.0, | 209.0, | 220.6, | 260.5, |
| 3 days   | 44.4,                       | 67.2,  | 78.5,  | 86.1,  | 91.9,  | 110.3, | 130.6, | 143.7, | 161.8, | 177.6, | 189.6, | 208.0, | 222.0, | 233.5, | 273.3, |
| 4 days   | 50.1,                       | 74.5,  | 86.6,  | 94.5,  | 100.6, | 119.8, | 140.8, | 154.3, | 172.8, | 189.0, | 201.2, | 219.8, | 234.0, | 245.6, | 285.5, |
| 6 days   | 60.4,                       | 87.5,  | 100.7, | 109.3, | 115.8, | 136.5, | 158.8, | 173.0, | 192.4, | 209.2, | 221.9, | 241.1, | 255.6, | 267.5, | 307.9, |
| 8 days   | 69.5,                       | 99.0,  | 113.2, | 122.4, | 129.4, | 151.3, | 174.7, | 189.6, | 209.8, | 227.1, | 240.2, | 259.9, | 274.9, | 287.0, | 328.2, |
| 10 days  | 78.0,                       | 109.6, | 124.7, | 134.4, | 141.7, | 164.7, | 189.2, | 204.6, | 225.5, | 243.4, | 256.9, | 277.2, | 292.4, | 304.8, | 346.8, |
| 12 days  | 86.1,                       | 119.6, | 135.4, | 145.6, | 153.3, | 177.3, | 202.7, | 218.6, | 240.2, | 258.6, | 272.4, | 293.2, | 308.8, | 321.4, | 364.1, |
| 16 days  | 101.2,                      | 138.1, | 155.3, | 166.3, | 174.6, | 200.4, | 227.4, | 244.3, | 267.1, | 286.4, | 300.9, | 322.5, | 338.7, | 351.8, | 395.8, |
| 20 days  | 115.3,                      | 155.2, | 173.7, | 185.5, | 194.3, | 221.6, | 250.1, | 267.9, | 291.6, | 311.8, | 326.8, | 349.2, | 366.0, | 379.5, | 424.8, |
| 25 days  | 132.1,                      | 175.4, | 195.2, | 207.8, | 217.3, | 246.3, | 276.4, | 295.1, | 320.0, | 341.1, | 356.8, | 380.0, | 397.4, | 411.4, | 458.1, |

NOTES:

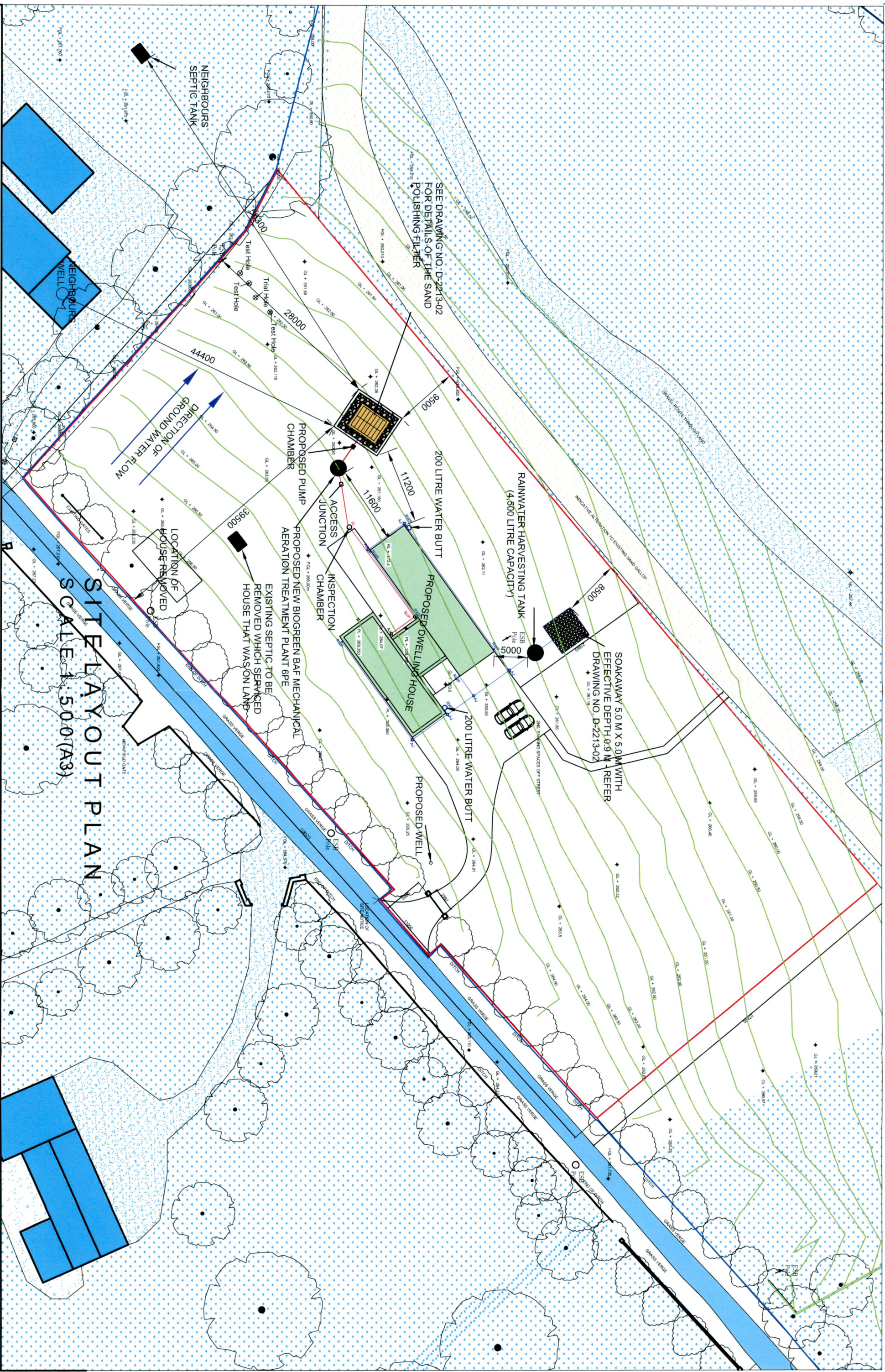
N/A Data not available  
These values are derived from a Depth Duration Frequency (DDF) Model

For details refer to:

'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',

Available for download at [www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies\\_TN61.pdf](http://www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf)

PATRICK JOYCE ASSOCIATES  
Consulting Engineers  
2 Prospect Grove  
Stocking Lane  
Rathfarnham, Dublin 16



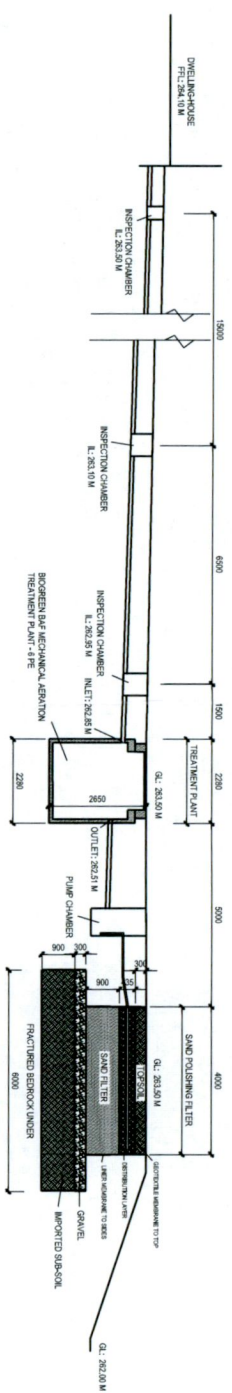
**Project Title:**  
 Site Suitability Assessment at  
 Redgap, Rathcoole, Co. Dublin

**Client:** Pearse McKleiman  
 Patrick Joyce Associates  
 2 Prospect Grove  
 Stocking Lane  
 Rathfarnham  
 Dublin 16  
 Tel: 087 2476375

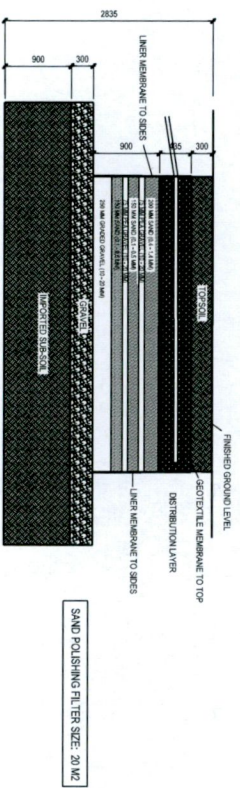
**Drawing Title:**  
 Drainage Layout Plan

Drawn by: Patrick Joyce  
 Scale: 1:500 @ A3  
 Date: September 2022

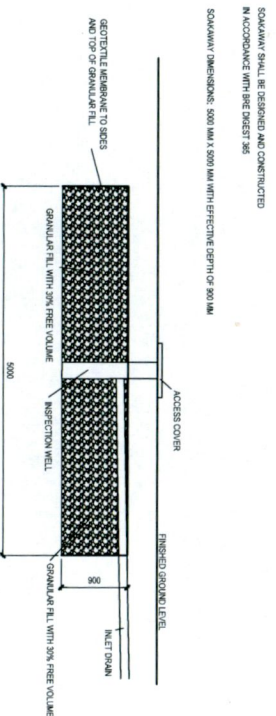
Drawing No: D-2213-01  
 Drawing Issues: PLANNING



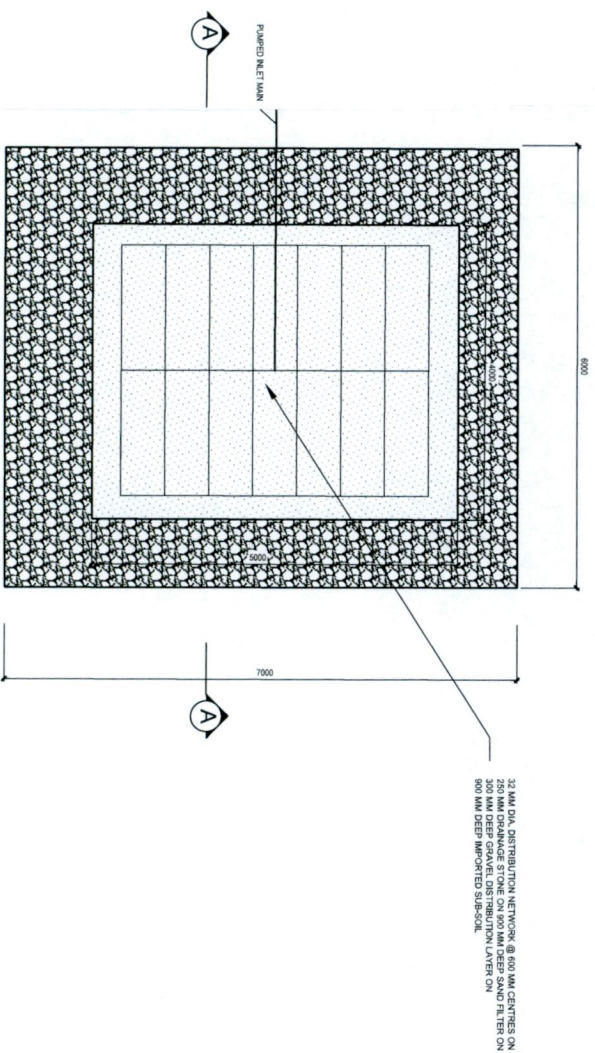
SECTION THROUGH WASTE WATER TREATMENT SYSTEM SCALE 1:100 (A1)



SAND POLISHING FILTER - SECTION SCALE 1:50 (A1)



SURFACE WATER SOAKAWAY - SECTION SCALE 1:50 (A1)



SAND POLISHING FILTER - PLAN SCALE 1:50 (A1)

SOAKAWAY SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH BRE EJECT 302

SOAKAWAY DIMENSION: 5000MM X 5000MM WITH EFFECTIVE DEPTH OF 900MM

13.0M DIA. DISTRIBUTION NETWORK @ 600MM CENTERS ON 200MM DEEP GRAVEL DISTRIBUTION LAYER ON 300MM DEEP SAND FILTER ON 900MM DEEP GRAVEL SILTATION

|     |                     |      |      |       |          |
|-----|---------------------|------|------|-------|----------|
| NO. | REVISION            | DATE | BY   | APP'D | DATE     |
| 1   | ISSUED FOR APPROVAL |      | P.J. | P.J.  | 14.02.21 |
| 2   | ISSUED FOR PERMITS  |      | P.J. | P.J.  | 14.02.21 |

CLIENT: MR. PEARSE MCKIERNAN

PROJECT: PROPOSED DWELLING-HOUSE AT REDGAP, RATHCOLE, CO. DUBLIN

TITLE: WASTE WATER TREATMENT SYSTEM & SURFACE WATER SOAKAWAY DETAILS

CONSULTING ENGINEERS: PATRICK JOYCE ASSOCIATES

3 Princes Quay, Sandycove Lane, Dublin 18. Telephone: (01) 494 6716. E-Mail: patrickjoyceassociates@gmail.com

|           |      |          |            |           |          |
|-----------|------|----------|------------|-----------|----------|
| DESIGNED: | P.J. | CHECKED: | P.J.       | APPROVED: | P.J.     |
| DRAWN:    | P.L. | DATE:    | MARCH-2021 | SCALE:    | AS-SHOWN |

DRG. No. D-2213-02