

1. Condition 13 – Temporary Drainage

Following a request from the Lead Local Flood Authority (LLFA), evidence has been provided to demonstrate the temporary storage required to manage surface water runoff during the construction phase, prior to the installation of the permanent drainage network. The assessment has been undertaken for a 1 in 2 year rainfall event with a duration of 6 hours.

The purpose of this document is to identify the anticipated runoff catchments and calculate the associated runoff volumes requiring temporary storage.

1.1 Current Site

The site is irregular in shape and is predominantly greenfield in nature. A small area of existing hardstanding is located along the western boundary where the Main Avenue carriageway currently terminates.

At present, surface water runoff is generated from both the vegetated areas and the existing hardstanding, flowing generally in an easterly direction following the site's natural topography. This runoff is intercepted by an existing building and boundary wall before discharging into a culverted watercourse located within the rear gardens of properties on Warneford Road.

1.2 Run-off Catchments

For the purposes of this assessment, it has been assumed that site clearance will be undertaken as a single phase operation. This would include the removal of all vegetation and trees identified for removal, resulting in the site being left as exposed soil during the initial construction stage.

The exposed ground conditions are anticipated to comprise clay and gravel soils.

The catchment areas used to determine the existing runoff volume are as follows:

- Vegetated area: 1.614 ha
- Existing hardstanding area: 0.079 ha

Total site area: 1.693 ha

1.3 Run-off Volumes

Autodesk InfoDrainage software has been used to calculate the existing runoff volumes generated by the site. The results of the assessment are presented in Figure 1.

The following parameters have been used within the runoff calculation:

- M5-60 (mm): Rainfall depth for a 60-minute storm with a 5-year return period. **A value of 17 mm has been applied for Huddersfield.**
- Ratio R: Ratio of the rainfall depth from a 60-minute storm to that of a 2-day storm, both with a 5-year return period. **A value of 0.30 has been applied.**
- Area (ha): Total undeveloped catchment area. **A catchment area of 1.693 ha has been assessed.**



- SAAR (mm): Standard Average Annual Rainfall (1961-1990). **A value of 900 mm has been applied, which falls within the typical Huddersfield range of 814 mm to 1,021 mm.**
- CWI: Catchment Wetness Index, representing antecedent soil moisture conditions and derived from average annual rainfall. **A conservative value within the typical range of 120-125 has been adopted.**
- Urban Area: Existing hardstanding area within the catchment, equal to **0.079 ha.**

The screenshot displays the 'UK and Ireland Rural Runoff Calculator' window. The 'Greenfield Volume' tab is selected. The 'Calculation Method' is set to 'FSR'. The 'Region' is 'England And Wales'. The 'M5-60 (mm)' is 17.0, and the 'Ratio R' is 0.300. The 'Area (ha)' is 1.693, 'SAAR (mm)' is 900.0, and 'CWI' is 122.000. The 'Urban' area is 0.079 ha, with a '2000' value in the adjacent field. The 'Areal Reduction Factor' is 1.00, and the 'SPR' is 47.000. The 'Storm Details' section shows 'Storm Duration (mins)' as 360 and 'Return Period (years)' as 2. The 'Calculate' button is visible. The 'Results' section shows 'PR%' as 46.81 and 'Greenfield Runoff Volume (m³)' as 204.181. The status bar at the bottom indicates '0.000 <= CWI <= 99999999.999' and includes 'OK', 'Cancel', and 'Help' buttons.

Figure 1 – Calculation Results

Based on the results of the assessment, a minimum temporary storage volume of **205 m³** will be required during the construction phase.

1.4 Control of Run-off

Temporary storage facilities provided during construction should ensure adequate settlement and removal of suspended sediments prior to discharge. The following design considerations should be incorporated:

- The location, dimensions and flow control arrangements of the storage facility should be designed in accordance with the volume of water requiring treatment and the anticipated sediment loading.



- Settlement storage should be designed to accommodate the Treatment Volume (Vt) as defined within CIRIA C697.
- Impermeable liners should be incorporated where required to prevent the infiltration of potentially contaminated water into underlying groundwater.
- Where settlement ponds are proposed, specific consideration should be given within the Contractor's Design Risk Assessment and Hazard Register to address the risks posed by open water to site personnel.
- Appropriate mitigation measures may include safety fencing, controlled access arrangements and warning signage around the perimeter of temporary storage areas.

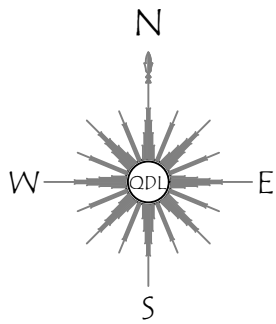
1.5 Flood Risk

As identified within the Queensberry Design Flood Risk Assessment, parts of the site are susceptible to surface water flooding.

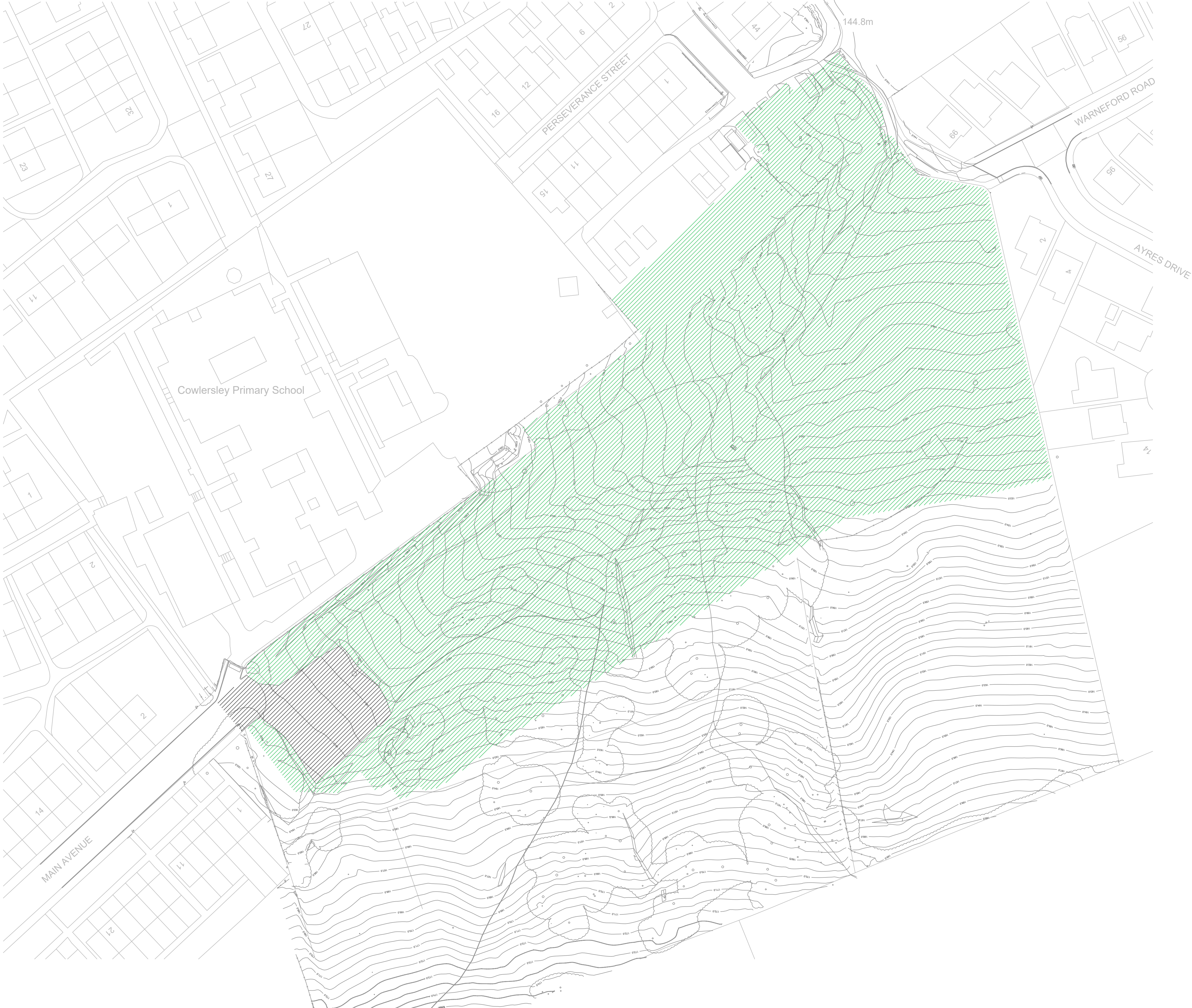
Any temporary storage facilities implemented during the construction phase should be designed and located to ensure that floodwater cannot enter the storage areas and compromise their effectiveness or available capacity.



Appendix 1 – Run-off Catchments



VEGETATED AREA	1.614 ha	
HARDSTANDING AREA	0.079ha	



Rev.	Date	Revision Details	Drawn	Checked
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