Hanson Aggregates UK

Westdown Quarry

Flood Risk Assessment

Wood Group UK Limited – January 2021

Report for

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Contents

1. Introduction

1.1 Purpose of this report

1.1.1 This Flood Risk Assessment (FRA) accompanies the Environmental Statement (ES) submission by Hanson Aggregates UK (hereafter referred to as Hanson) to Somerset County Council (hereafter referred to SCC) for the proposed recommencement of mineral extraction and subsequent restoration at Westdown Quarry (hereafter referred to as the Proposed Development), near Frome in Somerset. This report has been produced by Wood Group UK Limited (hereafter referred to as Wood). This FRA has been prepared in accordance with the National Planning Policy Framework[1] (NPPF, 2019) and associated Planning Practice Guidance[2]. Consultation with key stakeholders, including the Environment Agency (EA) and SCC (the Lead Local Flood Authority) has also informed baseline data gathering and the development of the FRA. Further details on consultation in relation to the water environment chapter and FRA are outlined in the **ES Chapter 10: Water Environment**.

1.2 Context

1.2.1 In accordance with the National Planning Policy Framework (NPPF, 2019) paragraph 164 states that a site-specific FRA is required for development proposals that are:

- One hectare (ha) or greater located in Flood Zone 1;
- All proposals for new development located in Flood Zones 2 and 3;
- All proposals for new development located in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency, EA); and
- Where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding.

1.2.2 In this case an FRA is required as parts of the planning application boundary are within Flood Zones 2 and 3. The site also exceeds 1 ha in area.

1.2.3 This FRA demonstrates how flood risk to the proposed development and any increased flood risk to third parties due to that development, will be managed over the lifetime of the development, taking climate change into account.

1.3 Terminology

Annual Exceedance Probability (AEP)

1.3.1 In this report, the probability of a flood occurring is expressed in terms of Annual Exceedance Probability (AEP), which is the inverse of the annual maximum return period. For example, the 1 in 100 year flood can be expressed as the 1% AEP flood, i.e. a flood that has a 1% chance of being exceeded in any year.

[1] Department of Communities and Local Government. National Planning Policy Framework. London: Department of Communities and Local Government, 2019.

[2] Department for Communities and Local Government. Planning Practice Guidance. 2014. http://planningguidance.planningportal.gov.uk/

1.3.2 **Table 1.1** is provided to clarify the use of the AEP terminology as well a description of the Flood Zone definitions as set out in the NPPF, Flood risk and coastal change guidance.

Table 1.1 Flood Zone definitions and associated annual exceedance probability

Flood Zones	Probability of flooding	AEP	Definition
Flood Zone 1	Low Probability	<0.1% AEP of river or sea flooding	Land with less than 1 in 1,000 probability of flooding from rivers or the sea, in any given year
Flood Zone 2	Medium Probability	1% - 0.1% AEP of river flooding 0.5% – 0.1% AEP of sea flooding	Land with between a 1 in 100 and 1 in 1,000 of river flooding; or land having between a 1 in 200 and 1 in 1,000 probability of sea flooding
Flood Zone 3	High Probability	>1% AEP of river flooding >0.5% AEP of sea flooding	Land having a 1 in 100 or greater probability of river flooding in any year; or Land having a 1 in 200 probability or greater of sea flooding in any year.
Flood Zone 3b	Functional Floodplain	The 5% AEP (or 1 in 20 annual probability) event is often used to help define Flood Zone 3b, the 'functional floodplain', but is not part of the definition	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency.

1.4 Sources of data and information

1.4.1 Sources of information utilised in this report are detailed below. Data requests/ consultation have also been undertaken with SCC, as the Lead Local Flood Authority (LLFA), and the Environment Agency (EA). Copies of relevant correspondence are provided in **Appendix A** and **Appendix B** respectively**.**

- National Planning Policy Framework (NPPF) (2019), https://www.gov.uk/government/publications/national-planning-policy-framework--2 (accessed 20/10/20);
- NPPF Flood Risk and Climate Change Planning Practice Guidance (2014), https://www.gov.uk/guidance/flood-risk-and-coastal-change (accessed 20/10/20);
- Environment Agency (2020) Flood risk assessments: climate change allowances Flood risk assessments: climate change allowances - GOV.UK (www.gov.uk) accessed 16/12/20;
- Environment Agency Flood Map for Planning Service https://flood-map-for-planning.service.gov.uk (accessed 18/08/2020);
- Environment Agency Long Term Flood Risk Map https://flood-warning-information.service.gov.uk/long-term-flood-risk/map accessed (accessed 18/08/2020);
- Somerset County Council (2011) Preliminary Flood Risk Assessment Report, https://www.somerset.gov.uk/waste-planning-and-land/flood-and-water-management/;
- Somerset County Council (2014) Local Flood Risk Management Strategy, Somerset's flood risk management strategy for surface water, groundwater and ordinary watercourses, https://www.somerset.gov.uk/waste-planning-and-land/flood-and-water-management/;
- Mendip District Council (2020) Strategic Flood Risk Assessment https://www.mendip.gov.uk/article/9110/Strategic-Flood-Risk-Assessment;

- Environment Agency (2012) Bristol Avon Catchment Flood Management Plan https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/294182/Bristol_Avon_Catchment_Flood_Management_Plan.pdf;
- Somerset County Council (2015) Somerset Minerals Plan Development Plan Document up to 2030, https://www.somerset.gov.uk/waste-planning-and-land/somerset-minerals-plan/;
- Somerset County Council (2013) Minerals Plan Strategic Flood Risk Assessment – Update November 2013 http://webcache.googleusercontent.com/search?q=cache:aaF-0zcWVZwJ:www.somerset.gov.uk/EasySiteWeb/GatewayLink.aspx%3FalId%3D45179+&cd=1&hl=en&ct=clnk&gl=uk;
- Somerset County Council (2011) Minerals and Waste Development Framework, Strategic Flood Risk Assessment http://webcache.googleusercontent.com/search?q=cache:0UGhwAAC_KoJ:www.somerset.gov.uk/EasysiteWeb/getresource.axd%3FAssetID%3D51325%26type%3Dfull%26servicetype%3DAttachment+&cd=2&hl=en&ct=clnk&gl=uk ; and
- Somerset County Council (2015) West of England Sustainable Drainage Developer Guide, Issue 1, https://www.bristol.gov.uk/documents/20182/34524/West+of+England+sustainable+drainage+developer+guide+section+1/864fe0d2-45bf-4240-95e2-a9d1962a0df9.

1.5 Structure of this report

1.5.1 The report is structured as follows:

- **Section 2** – Site Description, Development Proposals and Planning Context;
- **Section 3** – Flood Risk Assessment;
- **Section 4** – Surface Water Management;
- **Section 5** – Flood Risk Mitigation;
- **Section 6** – Compliance with Requirements of the LLFA; and
- **Section 7** – Conclusions and Recommendations.

1.5.2 The figures are embedded within the main body of the report while various supporting documents are presented at the end of the report in the form of appendices. These are as follows:

- **Appendix A** contains details of the consultation with SCC;
- **Appendix B** contains details of the correspondence and data provided by the Environment Agency;
- **Appendix C** contains photos of the Fordbury Water and borehole logs for the Site;
- **Appendix D** contains outline plans for the proposed working and restoration phases of the development; and
- **Appendix E** contains a technical note with the proposed surface water drainage for the Site.

2. Site description, development proposal and planning context

2.1 Site description

2.1.1 Westdown Quarry is a dormant limestone quarry which has not been substantially worked since the late 1980s. The quarry is located approximately 5 km to the southwest of Frome, in Somerset (National Grid Reference (NGR) ST 719 661). The site location is shown on **Figure 2.1** and **Figure 2.2.** The planning application boundary (hereafter referred to as the Site) covers an area of approximately 67.4 hectares (ha).

2.1.2 The site is effectively split into two parts by the Fordbury Water watercourse, as indicated in **Figure 2.3**:

- Westdown Quarry – to the east of Fordbury Water; and
- Asham Wood Void – to the west of Fordbury Water.

2.1.3 The Westdown Quarry part of the site includes the operational areas, haul roads, storage mounds/screening bunds. The Asham Wood Void area is a former mineral working area which is surrounded by woodland on all sides, and to the north west there is a small gully feature which runs through the woodland and perpendicular to the Fordbury Water. Westdown Quarry is bounded to the north by the Bulls Green Link Road (quarry link road constructed in the 1990's) and by the A361 to the south. To the west of the quarry is Asham Wood Void and to the east are agricultural fields.

2.1.4 The Site is covered by the following three existing minerals consents:

- Westdown Quarry:
  - Interim Development Consent Order (IDO) permission reference IDO/M/1/A (original planning reference 70 - dated 1 November 1947) registered as an IDO on 23 October 1992. This covers the Westdown Quarry area and extends across an area of approximately 54ha; and
  - Review of Old Minerals Planning Permission (ROMP) reference 016248/005 for the winning and working of limestone - Approval of Schedule of Conditions dated 4 November 1998. This ROMP consolidates two separate parcels of land to the north-east of IDO/M/1/A and an area within the southwest of IDO/M/1/A, collectively covering an area of approximately 14ha.
- Asham Wood Void:
  - IDO permission reference IDO/M/4/A (original planning reference 1492 - dated 28 June 1948) registered as an IDO on 27 October 1992. This permission covers the Asham Wood Void area and extends across an area of approximately 32.3ha.

2.1.5 Although the existing permissions do not expire until 21 February 2042, legislation requires that no further quarrying can commence until there is a determination of conditions pursuant to the Planning and Compensation Act 1991 in respect of the IDO permissions and determination of a full working and reclamation scheme (pursuant to condition 3) of the ROMP permission (in accordance with the Environment Act 1995).

2.1.6 Wide scale extraction has already taken place in the Asham Wood Void area and in the north-western part of the Westdown Quarry and whilst there are no remaining consented reserves left in Asham Wood Void, Westdown Quarry contains approximately 160 million tonnes (mt) of unworked Mendip limestone.

2.1.7 There are three other quarries in the area surrounding the Site. These include Hanson's Whatley Quarry located approximately 1.3km to the north of the Site, Aggregates Industries' Torr Works Quarry located approximately 0.3km from Site, and Aggregate Industries Colman's Quarry Complex adjacent to the southwest of the Site on either side of the A361 Holwell Hill Road.

2.1.8 The nearest residential receptors are properties located in the hamlets of Chantry and Cloford, approximately 1km north and south of the Site, respectively and the village of Nunney, located approximately 1.5km east of the Site. There are isolated properties located within approximately 0.2 to 0.5km north of the Site. There is also a farmhouse located approximately 0.75km west of the Site and west of Asham Wood Void, off Tunscombe Lane.

2.2 Topography

2.2.1 The topography of the general area slopes to the east, following a general eastward incline. The Fordbury Water watercourse cuts through this eastward-sloping landscape in a steep sided valley, thus bisecting the site itself (Ashdown Void to the west and Westdown Quarry to the east) and locally resulting in slopes towards the watercourse and thus creating a catchment divide on the Westdown Quarry side of the Site.

2.2.2 The catchment divide on the Westdown Quarry side of the site occurs approximately across its centre. In the northern half (which includes the former workings of Westdown Quarry) the topographic profile undulates to the north west from a mound at approximately 170m AOD to the base of the former quarry at approximately 138m AOD. Continuing westward, elevations then rise slightly to approximately 160m AOD before dropping into the Fordbury Water valley approximately at approximately 132m AOD (**Figure 2.1**).

2.2.3 In the southern half of the proposed Westdown Quarry area the ground gently slopes from the mound at approximately170m AOD to the south east beyond Westdown Farm at approximately150 m AOD to the south eastern boundary of the Site at the junction with the A361 approximately142m AOD. To the south east of the Site the land continues to slope gently towards the base of the Nunney Brook at approximately 112 m AOD.

2.2.4 Elevations on the Asham Wood Void part of the site show an overall increase from the base of the Fordbury Water (approximately 135m AOD) up to approximately 179m AOD at the north western corner of the Site. The land profile is relatively flat to the north of the Fordbury Water in the vicinity of the former workings which are approximately at the same level at the Fordbury Water. The former worked area then slopes to the north west to a level of 146m AOD suggesting Asham Quarry has been worked to approximately 11m below ground level, while the topography at Westdown is more natural. Outside of the Site to the north west the land continues to rise to an elevation of approximately 200m AOD at the top of the watershed near Torr site offices.

2.3 Hydrology and Drainage

Watercourses

2.3.1 The Site is situated within the catchments of the Fordbury Water and the Nunney Brook, which are both tributaries of the River Mells (**Figure 2.2**).

2.3.2 Fordbury Water bisects the site, with the Asham Void part of the site draining towards this watercourse. The northern half of the proposed Westdown Quarry area also drains into the Fordbury Water, which flows in a north easterly direction through the Site and joins the River Mells at Great Elm approximately 4.1km to the northeast of the Site. The southern half of the proposed Westdown Quarry area drains towards the south and east into the Nunney Brook, which is situated approximately 0.55km to the southeast of the Site. The Nunney Brook flows in a north easterly direction prior to discharging into the River Mells which is a Main River at Vallis Farm, approximately 4.9km to the northeast of the Site.

2.3.3 The section of the Fordbury Water which flows through the Site is designated as an Ordinary Watercourse and becomes a Main River (named Whatley Brook) approximately 480m to the northeast (downstream) of the Site. It is noted that the names Fordbury Water and Whatley Brook are used commonly interchangeably on OS mapping for this watercourse but in this report it is referred to as Fordbury Water. The Nunney Brook and the River Mells are designated as Main Rivers.

2.3.4 The EA have provided flow data for the gauging station Nunney on the Nunney Brook (Station No. 531220) located approximately 1.3km to the northeast of the Site (**Figure 2.2**). The river flows and catchment information for this location is shown in **Table 2.**.

Table 2.1 River flows and catchment information for Nunney Brook

Flow Gauging Descriptor	Nunney Brook (Nunney) Station Information
NGR	ST 73667 46238
Catchment area (km^2)	17.8 km2
BFI (Base Flow Index)	0.59
Q10 flow (m^3/s)	0.76
Mean flow (m^3/s)	0.33
Peak Recorded Flow on 1st Jan 2008 (m^3/s)	20.2
Flow record period	1998 – 2008
Mean Annual Rainfall (MAR, mm)	1127
HER* (mean flow/catchment area) (mm/year)	568
HER as % Rainfall	50.3

Notes: Flow gauging data provided by the EA
*HER- hydrologically effective rainfall

2.3.5 Discrete spot flow gauging was carried out by Wood to support a baseline hydrological understanding in the catchment for the ES. This included monitoring on the Fordbury Water at two locations in the vicinity of the Site during three monitoring rounds between August and November 2018. The monitoring locations include a location within the Site boundary and a location approximately 50m downstream of the Site (**Figure 2.2).** The monitoring data is provided in **Table 2.2** and indicates that the flows are higher at the downstream location in 2018.

Table 2.2 Flow Gauging Monitoring Results for Fordbury Water

Location	21st August 2018 Total Daily Flow (Ml/d)	26th September 2018 Total Daily Flow (Ml/d)	7th November 2018 Total Daily Flow (Ml/d)
Within the Site (ST71350 45634)	5.86	10.35	13.64
50m downstream of the Site (ST716814 5967)	6.27	11.33	17.87

2.3.6 Photographs of Fordbury Water obtained during the site visit on the 21st August 2018 are provided in **Appendix C**. The Site visit indicates that Fordbury Water is a gradually meandering channel with pools and riffles and some wooded debris. The watercourse channel ranges between 0.5m and 2m in width and 0.2m to 0.4m in depth. It is situated in a steep sided valley which has a height change of approximately 14m to 18m from the bottom of the valley (132m AOD) to the ridge crest of the valley (146 – 150m AOD) on its southern side, between the watercourse and the Westdown Quarry area. The flow is regulated at Westdown weir (ST 71346 45615) approximately 180m to the north of the Westdown Quarry.

Site Discharge

2.3.7 There are currently no water discharges from the Site. The nearest water discharge is from the neighbouring operational quarry, Aggregates Industries' Torr Works Quarry, which discharges the bulk of its dewatering directly to the Fordbury Water approximately 0.54km upstream of the Site (ST 69933 44299). Torr Works quarry and Coleman's quarry complex also provide augmentation to the Nunney Brook from header tanks related to Torr Works Quarry (ST 67946, 42679) and Coleman's quarry complex (ST72880, 14495) approximately 0.55km to the southeast of the Site.

2.4 Geology, hydrogeology and soils

i. The geology, hydrogeology and soils baseline at the Site are described in detail in ES **Chapter 10: Water environment**. A summary is provided below.

2.4.1 The BGS online geological mapping indicates that there are no superficial deposits at the Site except for a localised area of Head deposits (clay, silt, sand and gravel) near the western edge of the Westdown Quarry (there are no superficial deposits beneath the Fordbury Water/ Whatley Brook within the Site).

2.4.2 The bedrock geology underlying the Site comprises the Black Rock Limestone Subgroup of the Carboniferous period on the northern part of the Site, including Asham Wood Void, the northern area of Westdown Quarry and the Fordbury Water watercourse. The central part of the Site including most of Westdown Quarry is underlain by the Inferior Oolite Subgroup of the Jurassic period. The southern edge of the Site is underlain by the Vallis Limestone Formation from the Carboniferous Period.

ii. The Nunney Brook is underlain by Alluvium (clay, silt, sand and gravel) approximately 0.7km to the south of the Site. The bedrock geology in this area comprises the Forest Marble Formation and Inferior Oolite of the Jurassic period.

2.4.3 Online mapping (Defra, 2020) indicates that the Black Rock Limestone Subgroup and Inferior Oolite Group are classed as Principal Aquifers. These are defined as layers of rock that have high intergranular and/or fracture permeability (high level of water storage) which may support water supply and/or river base flow on a strategic scale. The small area of Head deposits on the western edge of the Westdown Quarry is classified as a Secondary (undifferentiated) aquifer, i.e. lower permeability formations that may have local scale importance for water supply and river baseflow depending on localised features.

iii. Geological logs for boreholes within Asham Wood Void area indicate that the Black Rock Limestone is encountered beneath approximately 2m of overburden and is present to depths of at least 102m (approximately 38m AOD). The logs also indicate a high degree of fracturing in places, as well as the presence of shale/limestone alterations that range from 5 to 10m in thickness (BGS, 2020). Groundwater levels have been monitored by Hanson on a monthly basis within the Site since 1994 at two boreholes in the Asham Wood Void area and one in Westdown Quarry (**Figure 2.2**). Groundwater levels at the three boreholes over period 1994 to 2020 are provided in **Appendix C** and show that:

- ASHAMQ1 (NGR ST 70627, 45184) data before 2002 shows groundwater levels fluctuating seasonally between 133m AOD (11 mbgl) during summer/early autumn and 140m AOD (4 mbgl) during winter, with a mean groundwater level of 135.4m AOD (8.6 mbgl). Groundwater levels dropped after 2002 to 122m AOD (22 mbgl) during summer and 134m AOD (10 mbgl) in winter, with a mean groundwater level of 129.6m AOD (14.4 mbgl);
- ASHAMQ2 (ST71057, 45444) data before 2002 showed annual fluctuations in groundwater levels smaller than those observed in Boreholes 1 and 3, ranging between 131.5m AOD (3 mbgl) and 134 (0.5 mbgl) and a mean level of 132.7m AOD (1.8 mbgl). From 2002, the summer groundwater levels dropped to around 124.5m AOD (10 mbgl), while winter levels drop to 133m AOD (1.5 mbgl), with a mean groundwater level of 129.6m AOD (4.9 mbgl);
- ASHAMQ3 (ST71485, 45475) show a similar pattern is observed to that in Borehole 1. Before 2002 groundwater levels ranged between 122.4m AOD (12 mbgl) and 133.41m AOD (1 mbgl), with a mean level of 127.2m AOD (7.2 mbgl). From 2002 onwards, the summer lows dropped to around 118.4m AOD (16 mbgl), while winter highs fell to around 129.41m AOD (5 mbgl), with a mean groundwater level of 123.3m AOD (11.14 mbgl);
- Each of the borehole logs indicate that there has been a downward trend in their groundwater minimum levels recorded since 2002, and this is likely due to the influence of the deepening at the neighbouring Torr Works Quarry. This is indicated to be more pronounced during drier summer periods. The borehole logs also indicate that overall the groundwater flows in a north easterly direction from ASHAMQ1 in the Asham Wood void area towards the Westdown Quarry area at ASHAMQ3. This observed trend follows the topographic slope of the wider area to the east, through which the Fordbury Water bisects within a steep sided valley; and
- Groundwater flow patterns vary during periods of high and low groundwater levels. During wetter periods, a gentle hydraulic gradient from higher levels at ASHAMQ1 to lower levels at ASHAMQ3 is observed, indicating that the river is draining the groundwater flows from the aquifer. During drier periods, there appears to be elevated

groundwater levels converging at ASHAMQ 2, located in close proximity to the Whatley Brook, suggesting the aquifer is locally recharged via stream losses.

2.4.4 The Cranfield University Soilscapes website (Cranfield University, 2020) indicates that soils at the Site comprise shallow lime-rich soils in Westdown Quarry areas and freely draining slightly acid loamy soils at Asham Wood Void area including the Fordbury Water valley.

2.5 Development Proposal

2.5.1 Hanson is proposing to recommence mineral extraction at Westdown Quarry and extract approximately 2.0mt per annum of aggregate grade limestone from the quarry over a period of 21 years, from 2021 to 2042, and it is anticipated that the restoration works will be completed by the end of 2044. Working phase and restoration plans are included in **Appendix D**.

2.5.2 The proposed worked scheme is outlined below:

- Mineral extraction will start on the western part of the quarry, and over time, move in a south-easterly and then northerly direction over a series of five separate phases. Output from the quarry would not exceed 2.0mt per annum. At its deepest the base of the excavation will be approximately 106m AOD (approximately 49m below current ground level);
- The limestone will be extracted through drilling and blasting techniques. The quarried mineral will be processed on site by primary mobile plant at the base of excavations before being processed further at secondary fixed plant and then stockpiled within the site, ready for onward transportation by road to local and regional markets. There will be no stockpiling within Flood Zones 2 and 3;
- Any top and sub-soils which require removal will be placed in bunds no higher than 3m around the perimeter of the Site and it is anticipated that overburden material (oolite) and inert quarry waste generated throughout the production process will be used as restoration fill material in the Asham Wood Void area of the site. This material will be transported to Asham Wood Void area using an existing watercourse crossing over the Fordbury Water. The restoration within the Asham Wood area will be carried out in a west - east direction in parallel to the Fordbury Water channel, and will be kept outside of Flood Zones 2 and 3;
- The Westdown Quarry will be worked dry by pumping. Associated with the depth of excavation, it is likely that the proposed workings will encounter quantities of groundwater from Phases 1-3, with more substantial quantities in Phases 4 and 5. Groundwater and surface water entering the quarry workings will be pumped from the base of the workings into a quarry sump (to be located in the north-eastern part of the Westdown Quarry void) and associated settlement system before discharging to Fordbury Water in the vicinity of the north western corner of the Site under a new discharge consent for the Site **(Figure 2.3)**; and
- The main Westdown Quarry area will be restored with a lake **(Appendix D)**. All other things being equal, i.e. dewatering of nearby quarries continuing (or new quarries occurring) initial groundwater level estimates indicate that groundwater levels (and thus lake levels) are estimated to equilibrate at approximately 120m AOD. It is possible that groundwater levels could rise above this in the instance that all dewatering in the surrounding area ceased, but this is considered an unlikely scenario given the long term viability of quarry operations in the surrounding area. .

2.5.3 The development will also include the following:

- Weighbridge, offices, wheelwash, fixed plant, stocking and vehicle parking area in the far-north eastern section of the Westdown Quarry part of the Site;
- Mineral processing plant in the northern section of the Site;
- Access ramping into and out of the quarry working areas; and
- Temporary soil and overburden bunding adjacent to quarry working areas.

2.5.4 Once restored the only public access will be via an existing and new footpath in the Asham Void Area as shown on the restoration plan in **Appendix D**. There will be no public access to the Westdown Quarry area.

2.6 Planning Context

2.6.1 Policy and relevant guidance to this FRA includes the following:

- Somerset County Council Preliminary Flood Risk Assessment (2011 and 2017 update): this document provides a high-level overview of flood risk and historical flooding in SCC administrative area from a variety of flood sources (surface water, groundwater, ordinary watercourses and canals). This information was used to formally identify Flood Risk Areas to comply with the European Union (EU) Floods Directive. The Site is not shown to be within an identified Flood Risk Area;
- Mendip District Council Level 1 Strategic Flood Risk Assessment (2020): this provides a strategic assessment of flood risk to feed into the local development planning process. It provides a summary of flood risk in the area including local mapping of flood risk from all sources and guidance on flood risk. The flood risk maps, set out within Map B in the document, show that the north western part of the Site (including partial areas to the south of Asham Wood Void) is within Flood Zones 2 and 3 and the southern and eastern areas (including the Westdown Quarry) are within Flood Zone 1. Flood Zone 3b (the functional floodplain) is not identified/delineated in the SFRA. The surface water flood risk maps indicate that most of the Site is at very low floor risk of surface water flooding. The groundwater flood maps indicate that the southern and eastern part of the Site (including the Westdown Quarry) are within an area with limited potential for groundwater flooding to occur whilst the northern and western part of the Site (including Asham Wood Void area and Fordbury Water) are within an area with potential for groundwater flooding to occur at the surface;
- Somerset County Council Strategic Flood Risk Assessment Level 1 (2011): This document was undertaken by SCC to support the minerals and waste local development framework. It reviews the flood risk policy, analyses the flood risk data, provides guidance to SCC for flood risk policy and future flood risk management decision making, provides supporting evidence to support SCC in the preparation of their Local Plan and provides guidance to developers in Sustainable Drainage Systems (SuDS);
- Somerset County Council Local Flood Risk Management Strategy (2013) sets out SCC's duties, responsibilities and strategy to manage the impact of flooding from 'local' sources, i.e. surface water, groundwater and ordinary watercourses. It also includes investigation of flood incidents, decision making about third party works on ordinary watercourse that may affect water flow and other works related to the maintenance of riparian watercourses;

- Bristol Avon Catchment Flood Management Plan (2012) provides an understanding of the scale and extent of current and future flooding in the wider catchment, sets policies for managing flood risk within the Bristol Avon catchment and promotes more sustainable approaches to managing flood risk. The plan does not specifically identify the Site or areas within its vicinity; and
- West of England Sustainable Drainage Developer Guide (2015): provides information on the planning, design and delivery of attractive and high quality SuDS schemes across the West of England and Somerset which should offer multiple benefits to the environment and community alike.

The Sequential Test

2.6.2 The Sequential Test is set out in the NPPF[1] and explained further in the accompanying Planning Practice Guidance. A sequential, risk-based approach to the location of development is required, both in terms of locating the site itself (the Sequential Test) and then the layout of the site (a sequential approach within the site). The Sequential Test aims to direct new development to the areas of lowest flood risk by a process of appraising other reasonable available sites within a suitable 'area of search'. Only when it is confirmed that there are no other suitable sites will development be permitted in areas of Flood Zone 2 and then sequentially Flood Zone 3. Even then, the development must account for the flood risk vulnerability of the proposed land use and to apply the Exception Test if required.

2.6.3 Although the site does not show as a current mineral allocation in the Somerset Minerals Local Plan[3] (identified as dormant), the site already has planning consent, covered by the three existing minerals consents discussed in **Section 2.1**, covering both Westdown Quarry and Asham Wood Void. The existing permissions do not expire until 21 February 2042; however, legislation requires that no further quarrying can commence until there is a determination of conditions pursuant to the Planning and Compensation Act 1991 in respect of the IDO permissions and determination of a full working and reclamation scheme (pursuant to condition 3) of the ROMP permission. Working can recommence once an updated schedule of conditions (supported by an EIA) has been attached to the consents. As such, it is deemed that the Sequential Test can be deemed passed provided the wider environmental impacts are deemed acceptable.

2.6.4 The NPPF also requires that a sequential approach should be applied to the layout and design when allocating land for development and land use types within development sites.

The Exception Test

2.6.5 The Exception Test, as set out in paragraph 160 of the NPPF, is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in national planning guidance.

2.6.6 Under the NPPF and the accompanying Guidance, the proposed limestone quarry has been assigned a flood risk vulnerability classification of 'Water Compatible' (assuming that it has a similar vulnerability classification to 'sand and gravel working') and the Site infrastructure (office, welfare and mineral processing plant) as 'Less Vulnerable' (offices and general industry). **Table 2.3**, reproduced from the NPPF online flood risk matrix, indicates that, for 'Water Compatible' and 'Less

[3] Somerset County Council, 2015. Somerset Minerals Plan: Development Plan Document up to 2030. Adopted February 2015. Available online at: http://www.somerset.gov.uk/EasySiteWeb/GatewayLink.aspx?alId=98609.

Vulnerable' development within Flood Zones 1, 2 and 3a the development is acceptable and the Exception Test does not need to be applied.

Table 2.3 Flood Risk Vulnerability and Flood Zone 'Compatibility'[4] Matrix

Flood Risk Vulnerability Classification	Essential Infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a*	Exception Test required*	✗	Exception Test required	✓	✓
Zone 3b**	Exception Test required**	✗	✗	✗	✓**

✓ Development is appropriate
✗ Development should not be permitted
*In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.
** In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere.

[4] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/575184/Table_3_-_Flood_risk_vulnerability_and_flood_zone__compatibility_.pdf

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371000

372000

146000

145000

N

Shearmoor Stream

Fordbury Water/ Whatley Brook

Nunney Brook

A361

Key

Westdown consolidating planning submission area

Topographic contour (m)

0 100 200 300 400 m

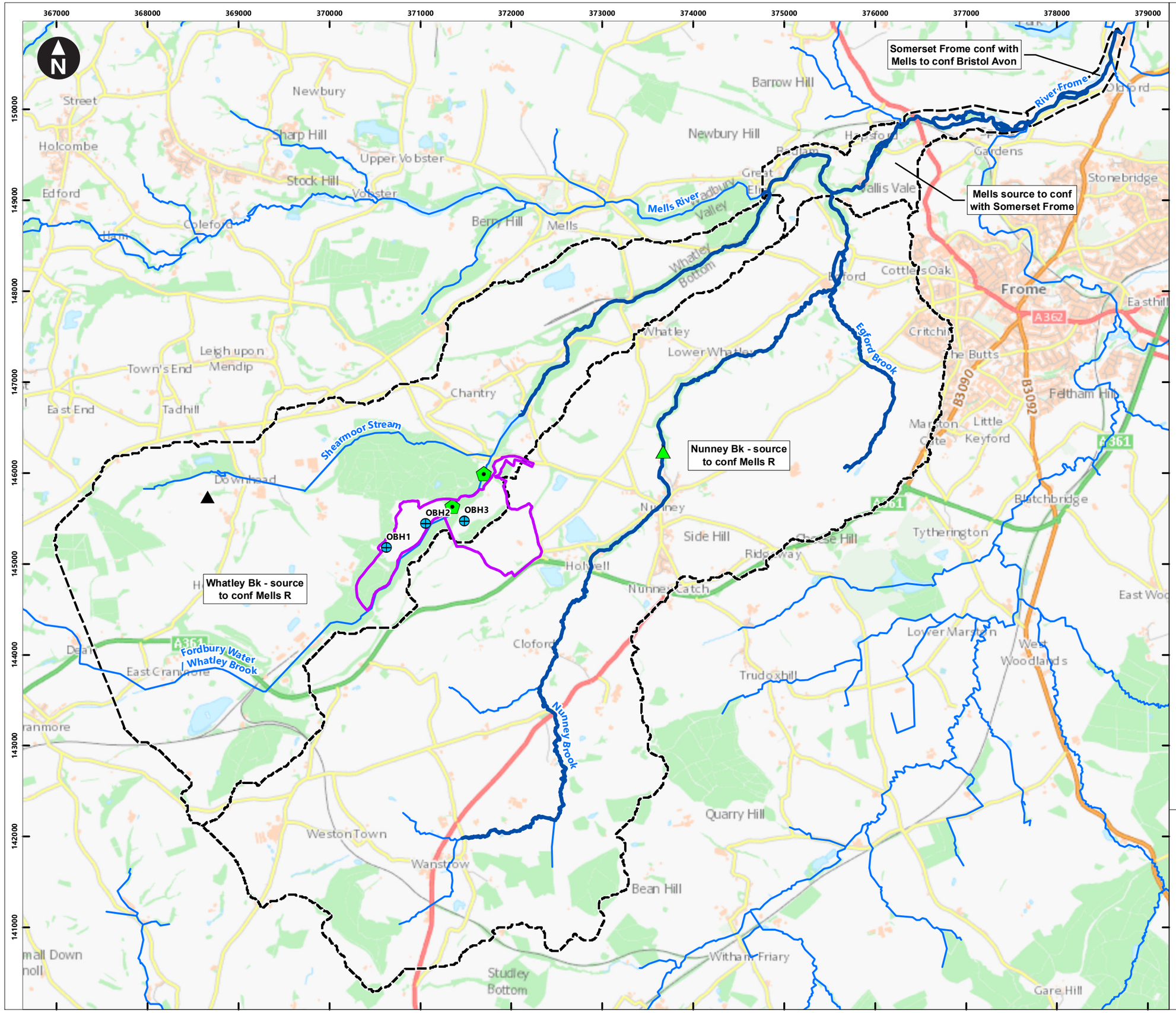
Scale at A3: 1:7,500

Westdown Quarry Consolidating Planning Submission
Flood Risk Assessment

Figure 2.1
Site location and topography

April 2021

wood.



Key

- Westdown consolidating planning submission area
- Main river
- Watercourse
- WFD river water body catchment

Hydrometric Stations

- EA flow gauge, Nunney
- EA raingauge, Downhead Reservoir
- Wood flow monitoring point
- Observation boreholes (OBH)

0 500 1,000 1,500 2,000 m

Scale at A3: 1:40,000

Westdown Quarry Consolidating Planning Submission
Flood Risk Assessment

Figure 2.2
Catchments, watercourses and hydrometric stations

April 2021

wood.

370000
371000
372000
373000
147000
146000
145000
144000
N
Bams Close Quarry
Finger Farm
The Hare Warren
Hale Combe
Rookery Farm
Limeklin La
Somers Hill
Knap Hill
Knaphill Farm
Leigh Rd
Green La
Mendip View
Holybush La
Bartle La
Bound La
Chantry
Green Farm
Shearmoor Wood
Castlehill Wood
Bordenham's Coppice
Bowcombe Coppice
Asham Wood
Dead Wo... Bottom
Shearmoor Stream
Little Manor
Lodge Hill Manor
Leighton
Broadgrove House
Cloford
Nunney Brook
Fordbury Water/ Whatley Brook
Asham Wood Void
Westdown Quarry
1 - 5
2 - 5
3 - 5
4 - 5
5
FRR1
FRR2
FRR3
FRR4
FRR5
FRR6
FRR7
FRR8
FRR9
FRR10
FRR11
Old School House
Bangle Farm
Cottage
Southfield House
The Bushes
Whatley
Nunney
Nunney Brook
Holwell
Holwell Hill
A361
Nunney Cat...
Marston...
Castle Hill
Primrose Hill
Berry Hill
Glaceland
Green Pitch La
Catch Rd
Ratford Bottom
Ratford Hill
Hom St
Key
Westdown consolidating planning submission area
Water body
Watercourse
Westdown Quarry area (including mineral extraction phase)
Indicative sump location
Indicative discharge point
Haul road
Soil storage bund
Oolite storage
Asham Wood restoration area
Potential flood risk receptor
0
200
400
600
800 m
Scale at A3: 1:15,000

Westdown Quarry Consolidating Planning Submission
Flood Risk Assessment
Figure 2.3
Excavation and restoration areas and flood risk receptors
April 2021
wood.
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370000
371000
372000
146000
145000
N
Mendip View
Shearmoor Wood
Shearmoor Stream
Castlehill Wood
Bodkenham's Coppice
Baucombe Coppice
Asham Wood
Green Farm
Bangle Farm
Lodge Hill Manor
Asham Wood Void
Westdown Quarry
1 - 5
2 - 5
3 - 5
4 - 5
5
Westdown Fa
Fordbury Water / Whatley Brook
Tonigre Cottage
Cloford
Broadgrove

Key

- Westdown consolidating planning submission area
- Watercourse
- Water body
- Westdown Quarry area (including mineral extraction phase)
- Indicative sump location
- Asham Wood restoration area
- Indicative discharge point
- Haul road
- Soil storage bund
- Oolite storage
- Environment Agency Flood Zone 3
- Environment Agency Flood Zone 2
- Environment Agency Flood Zone 1

0 200 400 600 m

Scale at A3: 1:10,000

Westdown Quarry Consolidating Planning Submission
Flood Risk Assessment

Figure 2.4
Environment Agency fluvial flood risk map for planning

April 2021

wood.

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