FISHERS WHARF EAST QUAY NEWHAVEN PORT

Proposed Aggregate Importation and Processing and the Manufacture of Value Added Products

Water Environment and Flood Risk Assessment

Prepared for: Brett Aggregates Limited

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SLR

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1.0 Introduction

SLR Consulting Ltd (SLR) has been commissioned by Brett Aggregates Limited (BAL) to prepare an assessment of the potential impacts on the water environment (hydrology and hydrogeology) of the proposed application for an aggregate importation, processing and manufacturing facility at Fishers Quay, Newhaven Port, which is owned by Newhaven Port Properties Limited (NPP).

The site is located at National Grid Reference (NGR) 545320 100456, see Drawing 1.

This report assesses baseline conditions at site, provides a summary description of the development, and considers potential impacts on the water environment (including groundwater, surface water and flood risk). Mitigation measures required to safeguard the water environment and residual impacts are also considered.

A site specific flood risk assessment is presented as Appendix 1, in accordance with and as required by National Planning Policy Framework (NPPF).

1.1 Statement of Competency

This assessment has been prepared by Gordon Robb BSc (Hons) MSc MBA FCIWEM C.WEM, who has more than 25 years consulting experience in the fields of hydrology, hydrogeology and flood risk. Gordon Robb is a Technical Director with SLR Consulting Limited.

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- EIA Management
- EIA Team Capabilities
- EIA Regulatory Compliance
- EIA Context & Influence
- EIA Content
- EIA Presentation
- Improving EIA practice

1.2 Assessment Structure

This assessment is structured as follows:

- Section 2 Outlines the approach and methodology undertaken within this assessment and also outlines the key policies and legislation used within the assessment.
- Section 3 Outlines the baseline geology, hydrological and hydrogeological site setting and details the potential receptors within a 2km radius of the site.
- Section 4 Present a summary of the proposed development and provides an assessment of the potential impact of the proposed development on the local hydrology, hydrogeology and identified receptors.
- Section 5 Provides a summary and conclusions.

2.0 Approach and Methodology

The potential impact of the proposed development on the water environment and flood risk has been assessed by following an Environmental Impact Assessment (EIA) methodology which includes an initial desk study of the baseline conditions followed by an impact assessment, the process of which are detailed in the following text.

2.1 Study Area

The application site is located at Fishers Quay, Newhaven Port and centred at NGR 545320 100456. The study area incorporates the red line boundary and a 2km radius from the site, as outlined on Drawing 1.

2.2 Methodology

To assess the potential impact of the proposed development on the water environment this assessment follows the approach as outlined within the *Town and Country Planning (Environmental Impact Assessment) Regulations, 2017*[1].

2.2.1 Approach

An initial desk study has been undertaken to determine and confirm the baseline characteristics by reviewing available information on soils, geology, hydrology and hydrogeology, such as groundwater resources, groundwater and surface water abstractions, surface water flows, flooding, rainfall data and water quality data. This has also included a review of published geological maps, Ordnance Survey (OS) maps, and site specific data, such as site investigation data, geological and hydrogeological reports, digital terrain models and geological literature.

Following the characterisation of the current baseline conditions an assessment of potential impacts on the water environment has been undertaken and possible measures to avoid and mitigate any adverse impacts have been outlined. An evaluation of the residual significance of these impacts following incorporation of mitigation measures follows.

2.2.2 Policy Context

This impact assessment has been undertaken in accordance with appropriate European, National and Local legislation and policy and with reference to appropriate good practice guidance, as outlined below:

European Legislation

The key piece of European Legislation that protects the UK's water environment is the Water Framework Directive (WFD) (2000/60/EC). This Directive protects all elements of the water cycle and seeks to enhance the quality of groundwaters, surface waters, estuaries and coastal waters.

National Legislation and Policy

Key national legislation and policy relevant to this proposed development includes:

- Environmental Permitting (England and Wales) Regulations 2016;
- Environment Act 1995;

[1] UK Government (2017) *Town and Country Planning (Environmental Impact Assessment) Regulations 2017*

- The Environment Agency's (EA) statutory obligations over the management and control of pollution into water;
- Environment Agency Groundwater Protection Guidance (previously covered by Groundwater Protection: Principles and Practice - GP3), including:
    - Environment Agency Guidance: Protect groundwater and prevent groundwater pollution, March 2017;
    - Environment Agency Guidance: Groundwater protection technical guidance, March 2017;
    - Environment Agency Position Statement: The Environment Agency's approach to groundwater protection
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003;
- Flood and Water Management Act, 2010;
- National Planning Policy Framework, Department for Communities and Local Government, March 2012; and
- Planning Practice Guidance to the National Planning Policy Framework, Department for Communities and Local Government, July 2017.

Local Planning Policy and Strategy

The main local planning policy documents relevant to the proposed development are:

- Lewes District Council Local Plan Part I Joint Core Strategy 2010 – 2030, Lewes District Council and South Downs National Park Authority, 2016; and
- East Sussex Downs and Brighton & Hove Waste and Minerals Local Plan, East Sussex, South Downs and Brighton & Hove, 2013.

Good Practice Guidance

Relevant UK guidance on good practice for construction projects is detailed in the following documents:

- Good Practice Guidance on Controlling the Effects of Surface Mineral Working on the Water Environment. Report to the Department of Communities and Local Government and to the Mineral Industry Research Organisation, March 2008;
- Control of Water Pollution from Construction Sites – Guide to Good Practice, CIRIA 2002; and
- Environmental Good Practice on Site C650, CIRIA 2005.

The Pollution Prevention Guidelines (PPGs) outlined below were developed jointly by the Environment Agency, Scottish Environmental Protection Agency and Environment and Heritage Service in Northern Ireland as guidance for prevention of pollution. It is noted that these were withdrawn by the Environment Agency on 17th December 2015, however in the absence of any new guidance it is considered appropriate to refer to them for general guidance. The following PPGs have been identified as relevant to the proposed development:

- PPG1 General Guide to the Prevention of Pollution (PPG1, July 2013)
- PPG2 Above Ground Oil Storage Tanks (PPG2, August 2011)
- PPG3 Use and Design of Oil Separators in Surface Water Drainage Systems (PPG3, April 2006)
- PPG4 Treatment and disposal of sewage where no foul sewer is available (PPG4, July 2006)
- PPG5 Works and maintenance in or near water (PPG5, October 2007)
- PPG6 Working at Construction and Demolition Sites (PPG6, May 2012)

- PPG21 Pollution Incident Response Planning (PPG 21, March 2009)
- PPG22 Incident Response – dealing with spills (PPG22, March 2011)

Guidelines for surface water management and flood risk are as follows:

- Development and flood risk – guidance for the construction industry, CIRIA Report C624, October 2004;
- Assessing and managing flood risk in development – Code of Practice, BS8533:2011, October 2011;
- Environment Agency standing advice on development and flood risk, Department for Environment, Food and Rural Affairs and Environment Agency, February 2017; and
- The SuDS Manual, CIRIA, 2015.

2.2.3 Information Sources

The following sources of information have been consulted in order to characterise the geology, hydrogeology and hydrology (inc. flood risk) of the area within and surrounding the application area:

- Ordnance Survey website for 1:25,000 scale explorer map (https://www. ordnancesurvey.co.uk);
- British Geological Survey online maps (www.bgs.ac.uk/data/mapViewers/home.html) for details of geology and borehole logs;
- British Geological Survey / Environment Agency (1997) The Physical Properties of Major Aquifers in England and Wales, Technical Report WD/97/34;
- British Geological Survey (1973) Hydrogeological Map of the South Downs and adjacent parts of the Weald
- Environment Agency Website (www.environment-agency.gov.uk) for details on aquifer classification, source protection zones and groundwater vulnerability;
- GOV.UK website (https://flood-map-for-planning.service.gov.uk/) for Flood maps including 'Flood map for planning' and 'Long term flood risk assessment for locations in England';
- Environment Agency Catchment explorer website (http://environment.data.gov.uk/catchment-planning/) for WFD classifications;
- Natural England magic map website (http://www.magic.gov.uk/) for details on designated ecological sites;
- Centre for Ecology and Hydrology Flood Estimation Handbook website (https://fehweb.ceh.ac.uk/);
- Correspondence with Tim Bartlett (Lewes District Council) for information on private water supplies;
- Emapsite Enviro Insight Report (included as Appendix 2) for details of licensed abstractions and discharges, geology, hydrogeological designations and pollution events; and
- Details of the proposed development provided by Brett Aggregates).

2.2.4 Significance Criteria

A qualitative risk assessment methodology has been used to assess the magnitude of the potential impacts associated with the proposed development. Two factors have been considered using this approach: the sensitivity of the receiving environment and the potential magnitude of impact, should that potential impact occur.

This approach provides a mechanism for identifying the areas where mitigation measures are required, and for identifying mitigation measures appropriate to the risk presented by the development. This approach also allows effort to be focused on reducing risk where the greatest benefit may result.

Criteria for determining the significance of impacts are provided in Table 2-1, Table 2-2 and Table 2-3 below. Impacts of **'major'** and **'moderate'** significance are considered to be *'significant'* in terms of the EIA Regulations.

Sensitivity

The sensitivity of the receiving environment (i.e. the baseline quality of the receiving environment as well as its ability to absorb the impact without perceptible change) is defined in Table 2-1.

Table 2-1
Sensitivity Criteria for Hydrological and Hydrogeological Receptors

Sensitivity	Definition
Very High	International importance: Receptor with a high quality and rarity, regional or national scale and limited potential for substitution / replacement.
High	National importance: Receptor with a high quality, local scale and limited potential for substitution / replacement; or Receptor with a medium quality and rarity, regional or national scale and limited potential for substitution / replacement.
Medium	Regional importance: Receptor with a medium quality and rarity, local scale and limited potential for substitution / replacement; or Receptor with a low quality and rarity, regional or national scale and limited potential for substitution / replacement.
Low	Local importance: Receptor with a low quality and rarity, local scale. Environmental equilibrium is stable and is resilient to changes that are greater than natural fluctuations, without detriment to its present character.

Magnitude

The potential magnitude of impact would depend upon whether the potential effect would cause a fundamental, material or detectable change. In addition, the timing, scale, size and duration of the potential effect resulting from the proposed scheme are also determining factors. The criteria that have been used to assess the magnitude of the impacts are defined in Table 2-2.

Table 2-2
Criteria for Assessing Magnitude of Impact

Magnitude	Criteria	Definition
Major	Results in loss of attribute	Fundamental (long term or permanent) changes to geology, hydrology, hydrogeology and water quality, such as: • wholesale changes to watercourse channel, route, hydrology or hydrodynamics • changes to site resulting in an increase in runoff with flood potential and also significant changes to erosion and sedimentation patterns

Magnitude	Criteria	Definition
		• major changes to the water chemistry or hydro-ecology
Moderate	Results in impact on integrity of attribute or loss of part of attribute	Material but non-fundamental and short to medium term changes to hydrology, hydrogeology and water quality, such as: • some fundamental changes to watercourses, hydrology or hydrodynamics. Changes to site resulting in an increase in runoff within system capacity • moderate changes to erosion and sedimentation patterns • moderate changes to the water chemistry of surface runoff and groundwater
Minor	Results in minor impact on attribute	Detectable but non-material and transitory changes to hydrology, hydrogeology and water quality, such as: • minor or slight changes to the watercourse, hydrology or hydrodynamics • changes to site resulting in slight increase in runoff well within the drainage system capacity • minor changes to erosion and sedimentation patterns • minor changes to the water chemistry
Negligible	Results in an impact on attribute but of insufficient magnitude to affect the use/integrity	No perceptible changes to hydrology, hydrogeology and water quality, such as: • no impact or alteration to existing important geological environs • no alteration or very minor changes with no impact to watercourses, hydrology, hydrodynamics, erosion and sedimentation patterns • no alteration to groundwater recharge or flow mechanisms • no pollution or change in water chemistry to either groundwater or surface water

Significance of Impact

The sensitivity of the receiving environment together with the magnitude of the impact defines the significance of the impact, as identified within Table 2-3. This also takes into account good practice measures implemented and embedded as part of the design and construction of the proposed scheme and use of professional judgement where appropriate.

Table 2-3
Significance of Impact

Magnitude	Sensitivity			
	Very High	High	Medium	Low
Major	**Major**	**Major**	**Moderate**	Minor
Moderate	**Moderate**	**Moderate**	**Moderate**	Minor

Magnitude	Sensitivity			
Minor	Minor	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Bold text denotes a significant effect in the context of the EIA Regulations

3.0 Baseline Conditions

The sites current baseline geological, hydrogeological and hydrological conditions are outlined below.

3.1 Geology

Published Geology

Review of British Geological Survey (BGS) mapping[2] indicates that the application site and surrounding area are located on Cretaceous Newhaven Chalk formation bedrock, which is overlain by superficial deposits of Alluvium.

The superficial alluvium is described as:

> *"Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger, desiccated surface zone may be present"*

Several borehole logs are available across the site and wider area on the British Geological Survey (BGS) website, with two logs located within the site boundary. The borehole logs indicate that the alluvium is between 28m and 29m in thickness beneath the site and typically comprises of brown, grey or blue silty clay. Occasional thin sandy and peat horizons are also recorded discontinuously throughout the sequence. The boreholes typically indicate sands and gravel at the base of the sequence, overlying the Chalk.

The Newhaven Chalk bedrock is described as a *"soft to medium hard, smooth white chalk with numerous marl seams and flint bands"*. A single BGS borehole drilled by Southern Water in 1989 immediately to the West of the site confirmed the Chalk to a depth of 60m below ground level and is considered to be between 40m and 70m in thickness.

Given the historic use of the site as a wharf it is likely that the in-situ geology is overlain by made ground. No site specific details are available, however the Southern Water borehole indicated Made Ground to a depth of 6m; it is likely a similar depth will be observed within the application site.

3.2 Hydrogeology

3.2.1 Hydrogeological Setting

The Environment Agency[3] designate the Chalk as a '*Principal Aquifer*' which is described as:

> *"layers of rock or drift deposits that have high intergranular and/or fracture permeability – meaning they usually provide a high level of water storage. They may support water supply and / or river baseflow on a strategic scale"*

Groundwater flow within the Chalk is typically dominated by fracture flow, exhibiting a very low intergranular permeability. The porosity, although high, does not drain under gravity and therefore effective groundwater storage and flow both occur within the fracture network. Fracturing is typically

[2] BGS Website (Accessed 03/08/17) http://mapapps.bgs.ac.uk/geologyofbritain/home.html
[3] Environment Agency What's in Your Backyard Website (accessed 03/08/17)

limited to the shallower chalk with the majority of flow taking place within the upper 20m – 50m of the aquifer[4].

The overlying alluvium is designated as a '*Secondary (Undifferentiated) Aquifer*' which the Environment Agency state is:

> *"assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases this means that the layer in question has been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock"*

Any groundwater flow within the superficial alluvium is typically limited to any higher permeability sand or gravel horizons within the strata. The available borehole logs indicate that the sequence primarily comprises silty clay which will likely impede groundwater flow, although some limited flow is possible within the thin sandier horizons or within the basal gravels, the latter which are likely to be in continuity with the underlying Chalk.

3.2.2 Groundwater Levels and Flow

No groundwater level monitoring data are available for the site, however the 'Hydrogeological Map of the South Downs'[5] indicates that the chalk groundwater is likely to be tidally influenced and therefore at a level of c.0mOD at site.

Given that the overlying alluvium is c.28m in thickness, based on ground elevation of between 3mAOD and 6.5mAOD across the site it is expected that the top of the Chalk bedrock is present at a depth of approximately -25mOD, indicating that the chalk groundwater is likely to be confined beneath the lower permeability alluvium.

Given that the groundwater is tidally influenced flow direction will vary dependent on tide conditions. Regionally groundwater flow in the Chalk and alluvium will be southwards and toward the sea.

There is potential for limited groundwater to be present within the alluvium and potentially the made ground beneath the site. Any groundwater will be preferentially stored and transmitted with in more permeable horizons (sand and gravel) within these units and will also like be tidally influenced. Groundwater elevations are expected to be near 0mAOD.

3.2.3 Groundwater Quality

Due to the sites coastal location the groundwater quality will be highly influenced by tidal waters. Mapping included within the 'Hydrogeological Map of the South Downs' confirms this and indicates that chloride concentrations at shallow depths are in excess of 400mg/l. It is expected the alluvial aquifer will also exhibit elevated chloride.

3.2.4 Groundwater Abstractions and Groundwater Vulnerability

Details of licensed abstractions are included within the emapsite Enviro Insight report (Appendix 2) which indicates that there is one licensed groundwater abstraction located within a 2km radius of the site. The

[4] BGS (1997) *The physical properties of major aquifers in England and Wales*, Ref: WD/97/34
[5] BGS (1973) *Hydrogeological Map of the South Downs and Adjacent Parts of the Weald*

abstraction is owned by Newhaven Port and Properties Ltd and is located approximately 1.8km to the north of the site. The location of the abstraction is shown on Drawing 1 and details are outlined within Table 3-1.

Lewes District Council[6] has indicated that they have record of a single private abstraction, located approximately 1.5km to the north of the site which is owned by Newhaven Port Properties. It is considered likely that the abstraction noted by the council is the same as the licensed abstraction noted above. This existing borehole and consented abstraction would be the source of water supply for the proposed aggregate processing operations.

A review of the Environment Agency website[7] indicates a further eight licensed abstractions within the wider Chalk aquifer catchment, all of these are located in excess of 2km from the site and therefore beyond the study area. One licensed abstraction of note however is a large public supply well which is located approximately 2.5km to the north-east of the site.

Table 3-1
Licensed Abstractions near to Site

Water Supply ID	Usage (m^3/day) (m^3/yr)	Source	Use	Licensee	Distance from Site (km)
10/41/261002	1,477m^3/day 500,060m^3/yr	Groundwater	Transport	Newhaven Port & Properties Ltd	1.85km North
10/41/260401	37,760m^3/day 7,467,000m^3/yr	Groundwater	Public Supply	South East Water Limited	c.2.5km North-East
Lewes District Council record	unknown	Groundwater	Private Water supply serving the port at Denton	Newhaven Port and Properties	c. 1.5km North

Review of Environment Agency mapping[3] confirms that the site is not located within a groundwater Source Protection Zone (SPZ), the closest SPZ being associated with the large public supply well, located approximately 2km to the north-east (e.g. upstream of the site).

The chalk is classified as having a groundwater vulnerability of *'Major Aquifer High'* (see Appendix 2) indicating that the chalk is highly sensitive to pollution due to its fractured nature. It is however noted that the mapping does not take into account the presence of the overlying alluvium which will act as a barrier to any near surface pollution migrating to the chalk.

[6] Email from Tim Bartlett (Lewes District Council) to Martin Baines (SLR) on 24 July 2017, *RE: Fishers Wharf proposed development*
[7] Environment Agency What's in Your Backyard Website (accessed 03/08/17)

3.2.5 Water Dependent Designated Sites

Review of the Magic Map webpage[8] indicates that the site is located on the eastern edge of the Brighton and Lewes Downs Biosphere reserve, an area noted for its chalk downland (including deciduous woodland and chalk grassland), coastal chalk cliffs, sub-tidal chalk reefs and freshwater wetland.

There are however no specific water dependent designated sites recorded within a 2km radius of the site.

3.3 Hydrological Setting

The Site is located within Newhaven Harbour, which is bound to the north by the Mill Creek, to the west by the River Ouse and to the south by Seaford Bay and the English Channel.

Ground levels at site vary from 3.20mAOD to 6.5mAOD (see Flood Risk Assessment, Appendix 1).

3.3.1 Site Drainage

A services plan was prepared for Newhaven Port & Properties by Hemsley Orrell Partnership in May 2012. The plan shows two surface water sewers to the west of the site which form part of the surface water sewer network serving the western and northern part of East Quay. The surface water sewer serving the existing building to the south west of the railway line outfalls to the Mill Creek via a 150mm diameter pipe with an invert level of 1.33m AOD.

The second surface water sewer serves the existing building adjacent to the western boundary of the site and the hardstanding area along the River Ouse. This sewer was assumed to outfall into the River Ouse as shown on the services plan.

Moreover there are a number of gullies and channels across the site which it is understood drain in a northerly direction towards the Mill Creek. The topographic survey identifies a number of outfalls along the Mill Creek, to the north of the site and east of the outfall identified on the services plan, which are anticipated to be associated with the drainage of the site. The southern part of the site, comprising the proposed concrete batching plant and parking area, is currently laid to gravel. It is therefore anticipated that surface water runoff from this area is 'drained' via infiltration into the underlying soils.

Further details of the site's hydrology including copies of the services plan and topographical survey are included within the Flood Risk Assessment included as Appendix 1.

3.3.2 Surface Water Quality

The application site falls within the South East River Basin District of which both the River Ouse, located to the west of the site, and the coastal waters to the south (as part of the Sussex TraC) have been assessed as part of the Water Framework Directive (WFD). It is noted that Mill Creek has not been assessed.

The current (2016) WFD classification for both waterbodies is summarised in Table 3-2.

[8] Natural England Magic Website (Accessed on 03/08/17)

Table 3-2
Water Framework Directive Classification

Waterbody	Elements	Sub-Elements	Current Status	Objectives
South East TraC	Overall Status		Moderate	Good by 2027
	Ecological Status	Overall	Moderate	Good by 2027
		Biological Quality	Good	Good by 2015
		Physio-Chemical	Good	Good by 2015
		Specific Pollutants	High	High by 2015
		Supporting elements (Surface Water)	Moderate	Good by 2027
	Chemical Status	Overall	Good	Does not require assessment
Ouse Lower	Overall Status		Moderate	Moderate by 2015
	Ecological Status	Overall	Moderate	Moderate by 2015
		Biological Quality	High	Good by 2015
		Hydromorphological	Supports Good	Supports Good by 2015
		Physio-Chemical	Moderate	Moderate by 2015
		Specific Pollutants	High	Not assessed
		Supporting elements (Surface Water)	Moderate	Moderate by 2015
	Chemical	Overall	Good	Does not require assessment

3.3.3 Flood Risk

A review of the Environment Agency "*Flood Mapping for Planners*" webpage indicates that the application site is located partially within Flood Zone 3 (High Probability) associated with a combined tidal and fluvial flooding. A detailed review of flood risk is presented in the supporting flood risk assessment (see Appendix 1). A summary of the potential risk posed by potential sources of flooding at the site is presented in Table 3-3.

Table 3-3
Potential Sources of Flood Risk

Potential Source	Potential Flood Risk to Application Site	Reason for Decision
Fluvial/Tidal flooding	Yes	The site is located partially within Flood Zone 3 associated with combined fluvial and tidal sources
Flood Defence Breach (Failure)	Yes	The Flood Map for Planning indicates that the site benefits from flood defences in the vicinity of the site
Flooding from rising / high groundwater	No	The underlying chalk aquifer is confined by the low permeability overlying alluvium which will limit the potential for groundwater to rise to surface. Groundwater in the chalk and alluvium will readily discharge to the sea

Potential Source	Potential Flood Risk to Application Site	Reason for Decision
Pluvial Overland flow flooding	Yes (Localised)	Flood mapping indicates that the majority of the site is classified as 'Very Low' risk, however a few localised low lying areas are higher risk
Flooding from artificial drainage systems	Yes (not significant)	Assessment of sewer flood risk suggests that although there is the potential of the sewer system becoming locked during extreme high tide it is unlikely to pose a higher risk than tidal flooding and has therefore been assessed as not significant
Flooding due to infrastructure failure	No	There is no infrastructure associated with the current or proposed development.

The flood risk to the site is outlined in further detail within the FRA, enclosed as Appendix 1.

3.4 Summary of Conceptual Site Model

The sites conceptual hydrogeological model is summarised in Table 3-4. This model is used to complete the impact assessment.

Table 3-4
Summary Conceptual Site Model

Geology	The application site is located on an existing wharf which is constructed on made ground above superficial alluvial deposits comprising primarily silty clay deposits with occasional sand and peat horizons, with basal gravel. The superficial deposits overlie Newhaven Chalk bedrock. The alluvium is estimated to be approximately 28m in thickness across the site, with the underlying chalk between 40m and 70 thick.
Hydrogeology	The underlying chalk bedrock is classified as a Principal Aquifer, with groundwater flow and storage occurring within fractures within the upper part of the sequence. Groundwater within the chalk is expected to be tidally influenced with groundwater levels at around 0mOD. Groundwater flow will be toward the sea. The overlying alluvium is dominated by low permeability silty clay deposits which will act as an aquiclude above the chalk, resulting in confined groundwater conditions in the chalk. There is no direct linkage between the site and chalk. There is the potential for limited groundwater flow within the superficial alluvial deposits. Groundwater quantities are expected to be small. Groundwater levels will be tidally influenced and groundwater flow will be toward the sea at or near an elevation of 0mAOD. Chalk and alluvial groundwater quality beneath the site is likely to be saline in nature.
Local Receptors	There is one licensed and one private abstraction recorded within a 2km radius of the site, owned by the current landowner and considered to be abstracting from the chalk. All abstractions are up-gradient of the site and are believed to be from the chalk aquifer, which is confined approximately 29m below ground level beneath the superficial alluvium.

	There are no designated water-dependant sites within 2km of the site although the site is located within the Brighton and Lewes Downs Biosphere reserve. The site is located within Newhaven Harbour, between Mill Creek and River Ouse with Seaford Bay to the South. Both the River Ouse and the Sussex TraC coastal area are classified within the Water Framework Directive.

4.0 Assessment of Potential Impacts

4.1 Description of the Proposed Development

In summary the proposal comprises of the following main components which will be developed in stages or phases:

- the construction of an aggregate processing plant and an aggregate bagging plant;
- marine dredged aggregates would be imported by ship at the existing quay;
- distribution of processed aggregates in bulk would be by both road and rail;
- when a new port access road is opened (by-passing Railway Road, Clifton Road and Beach Road and to be the subject of a third party planning application) a ready mixed concrete batching plant and a concrete block making plant would be established.

4.2 Good Practice Guidance and Embedded Mitigation

The site would be developed and managed in accordance with good practice guidance including UK guidance on good practice for mineral and construction projects detailed within the following documents:

- Good Practice Guidance on Controlling the Effects of Surface Mineral Working on the Water Environment. Report to the Department of Communities and Local Government and to the Mineral Industry Research Organisation, March 2008;
- Control of Water Pollution from Construction Sites - Guide to Good Practice, CIRIA 2002; and
- Environmental Good Practice on Site C650, CIRIA 2005.

The Pollution Prevention Guidelines identified below are the principal guidance documents for preventing water pollution and erosion from construction activities and are jointly produced by the Environment Agency, Scottish Environment Protection Agency and the Environment and Heritage Service in Northern Ireland:

- PPG1 General Guide to the Prevention of Pollution (PPG1, July 2013)
- PPG2 Above Ground Oil Storage Tanks (PPG2, August 2011)
- PPG3 Use and Design of Oil Separators in Surface Water Drainage Systems (PPG3, April 2006)
- PPG4 Treatment and disposal of sewage where no foul sewer is available (PPG4, July 2006)
- PPG5 Works and maintenance in or near water (PPG5, October 2007)
- PPG6 Working at Construction and Demolition Sites (PPG6, May 2012)
- PPG21 Pollution Incident Response Planning (PPG 21, March 2009)
- PPG22 Incident Response – dealing with spills (PPG22, March 2011)

Guidelines for surface water management and flood risk assessment are as follows:

- The SuDS Manual (Report C753). CIRIA, 2015; and
- National Planning Policy Framework and Guidance.

In accordance with this guidance the design and development proposals have incorporated the following elements:

- no significant re-profiling of existing ground levels is proposed;
- all areas of fuel or chemical storage would be bunded and be positively drained to prevent accidental leakage of fuels and chemicals to the water environment;
- a traffic management plan would developed and speed limit would be used on site to minimise the potential for accidents and leakage of fuels or chemicals;
- emergency spill response kits would be maintained on site;
- no new groundwater or surface water abstractions are proposed;
- foundations associated with proposed processing plant and buildings would be shallow in order to minimise the size of foundations, and to prevent the ingress of groundwater;
- all foul water on site would be discharged to existing foul water sewer or to sealed tanks;
- drainage from areas of mineral processing and stockpiling would be collected and re-used in the proposed mineral wash plant;
- the mineral wash plant would recirculate water, and only require limited top up (to be provided by site runoff whenever possible); and
- storm water drainage from buildings and areas of car / lorry car parking, would be drained to existing drainage infrastructure.

4.3 Assessment of Potential Impacts

The potential impact of the proposed development on the water environment has been assessed based on the methodology outlined within Section 2 and taking into account the good practice measures and embedded mitigation outlined in Section 4.2. The significance of impact has been assessed based on the approach outlined in Table 2-3.

4.3.1 Groundwater Levels, Flow and Abstractions

As discussed within Section 3, groundwater is present at depth (>20m) in the chalk aquifer beneath the site. Between the site and the chalk there is a significant thickness of low permeability alluvium. The proposed development will not penetrate the alluvium and will not, therefore establish a pathway to the chalk. No dewatering or new groundwater abstraction is proposed. Existing drainage paths will be maintained, and therefore there will be no significant change to the aquifer recharge provided by the site.

The sensitivity of the chalk is considered high. The magnitude if of impact is assessed as negligible, and it is concluded therefore that there would be a '**negligible**' impact on groundwater levels, abstractions and flow in the chalk.

Some groundwater may also be present in the alluvium beneath the site. It has been shown that locally this is not an important water bearing unit and that the proposed development is unlikely to affect groundwater movement or storage in the alluvium as no development is proposed at an elevation of 0mAOD, where the groundwater is present.

The sensitivity of the alluvium is considered moderate. The magnitude if of impact is assessed as negligible, and it is concluded therefore that there would be a '**negligible**' impact on groundwater levels and flow in the alluvium.

4.3.2 Surface Water Flow and Flood Risk

At present the majority of runoff generated on site infiltrates to the made ground / alluvium. This will continue to be the case. Areas that are currently positively drained will be retained and continue to be used. Runoff from areas of mineral processing and stockpiling will be collected, managed and used in the proposed mineral wash plant.

The sensitivity of the River Ouse and Mill Creek is considered medium. The magnitude if of impact is assessed as negligible, and it is concluded therefore that there would be a '**negligible**' impact on surface water flow.

A detailed consideration of flood risk is given in Appendix 1. To safeguard employees and vulnerable parts of the site it is recommended that weighbridge, mess room and welfare facilities are raised to a minimum of 5.71mAOD, which provides a minimum freeboard above the design flood level of 5.41mAOD. It is also proposed that the site subscribe to the Environment Agency's 'Floodline' flood warning service, and a Flood Emergency Plan is prepared for the site; it is expected that this would be secured by an appropriately worded planning condition. With these safeguards, it is considered flood risk can be appropriately managed and there would be '**negligible**' flood risk impact to site or off-site / third parties.

4.3.3 Surface Water and Groundwater Quality

The site would be developed and managed using current technical guidance, relevant Pollution Prevention Guidelines, other codes of best practice, to limit the potential for contamination of both ground and surface waters (see 4.2 above). Runoff from areas of stockpiling would be collected and used as top up water for the on-site mineral wash plant.

These measures would significantly reduce the likelihood of pollutants, including suspended solids, being discharged from the site. The sensitivity of the chalk is considered high, and the alluvium, Mill Creek and River Ouse medium. The magnitude if of impact is assessed as negligible, and it is concluded therefore that there would be a '**negligible**' impact on surface and groundwater quality.

The efficacy of the site controls would be subject to routine inspection and if required amended to ensure ground and surface water quality is not impaired during development or operation of the site.

4.3.4 Mitigation Measures

The impact assessment as outlined above confirms that no *'significant'* impacts have been identified and therefore there is no requirement for additional mitigation measures above or beyond the embedded mitigation outlined within Sections 4.2 and 4.3.

4.3.5 Residual Effects

The impact assessment has confirmed that there are no significant impacts identified.

Overall, it is concluded that, with respect to groundwater and surface water, there would be no significant residual effects of the proposed development.

5.0 Summary and Conclusions

SLR Consulting Limited has been commissioned by Brett Aggregates Limited to prepare a Water Environment (Hydrology and Hydrogeology) assessment in support of a proposed application for an aggregate importation, processing and manufacturing facility at Fishers Quay, Newhaven Port.

The report assesses baseline conditions at site, provides a summary description of the development, and considers potential impacts on the water environment (including groundwater, surface water and flood risk).

A site specific flood risk assessment is presented as Appendix 1, in accordance with and as required by National Planning Policy Framework (NPPF).

It has been shown as a consequence of the proposed site design and with the adoption of industry standard best practice no impacts on groundwater or surface water flows, levels or quality are anticipated. Measures have been proposed to safeguard employees and vulnerable site infrastructure from flood risk.

DRAWINGS