4 Building envelope - facade development

PORTLAND BILL

BUILDING ENVELOPE - FACADE DEVELOPMENT

4.1 INTRODUCTION

INTRODUCTION

4.1.1 This section sets out the design principles that have been considered to further enhance the design and firmly embed the proposals within its setting.

4.1.2 As noted above the massing has looked to draw inspiration from the geological formations and more recent man made activity that shapes the Isle of Portland.

4.1.3 The design of the building's facade and material selection looks to build on this with inspiration being taken from the distinctive steep escarpments and vegetation of East Weare.

MATERIALS

4.1.4 The massing of the building, as set out in the previous section, has resulted in the creation of two distinct volumes, the RDF store and Turbine Hall and the boiler and Exhaust Air Filtration Room. Whilst the design of the elevations might include further, subtle articulation, it is proposed that the elevational treatment and materials reflects the two volumes to create a calm, simple aesthetic.

4.1.5 It is proposed that one volume is clad in white to light grey cladding reflecting the exposed limestone cliff faces, whilst the second volume picks up on the green scrub vegetation of the lower escarpments helping the building recess into the landscape behind, when viewed from the AONB and WHS.

4.1.6 The following pages look at how the materials should be distributed and the detailed facade design which all combine to create a cohesive building composition.

Exposed rock strata in the quarry east of Grove Road

FIG 4.1
BROADCROFT QUARRY, PORTLAND

FIG 4.2
WESTERN PORTLAND CLIFF FACE JUST NORTH OF SOUTHWELL BUSINESS PARK

BUILDING ENVELOPE - FACADE DEVELOPMENT

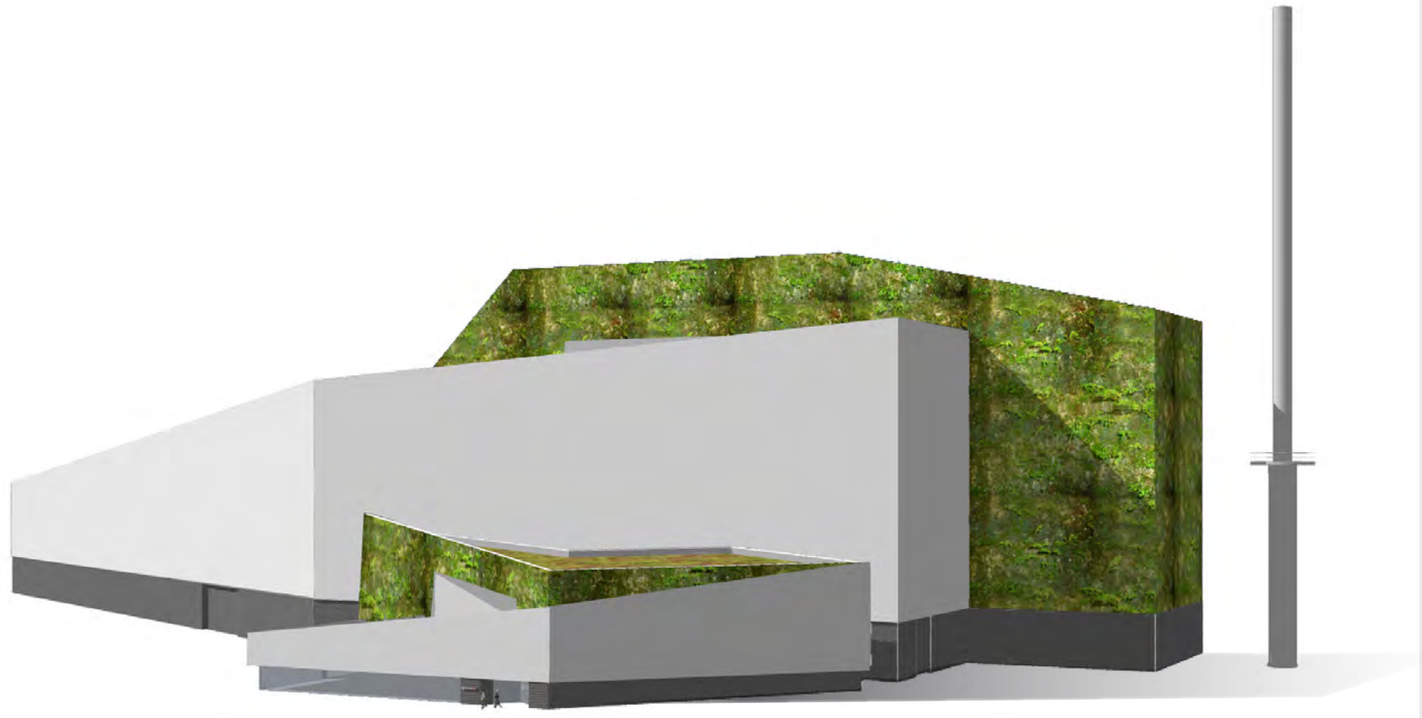
4.3 MATERIAL COMPOSITION

OPTION 1
GREEN WALL TO REAR

4.2.1 The green cladding is placed on the taller rear volume making this recess into the undercliff behind, leaving only the lower grey clad volume visible from the long distance views from the AONB and WHS.

4.2.2 Whilst still slightly taller the scale of the grey clad volume is comparable and in keeping with the shed buildings of the existing port.

4.2.3 As the taller volume extends further north the green cladding would appear to wrap down the right hand edge of the eastern elevation, as viewed from the AONB and WHS. This could create the separation of the grey volume from the other port buildings and result in the visual elongation of the port when viewed across Weymouth and Balaclava Bay.



View from Balaclava Bay

View from Sandsfoot Castle indicative views in context

View from northern shipping lane

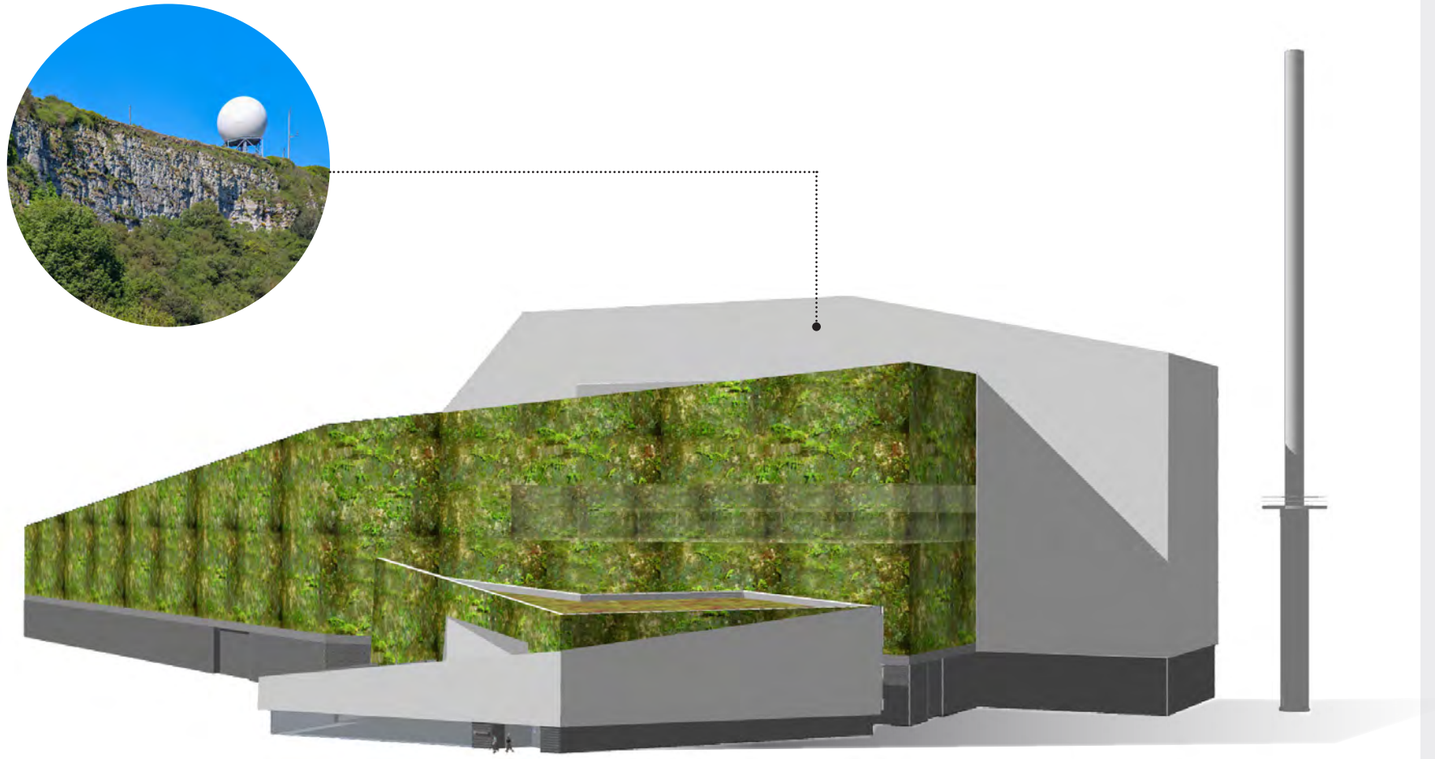
FIG 4.3
MATERIAL COMPOSITION OPTION 1 - GREEN CLADDING TREATMENT TO THE REAR

OPTION 2
GREEN WALL TO THE FRONT

4.2.4 The green, lower volume wraps across the front of the boiler house behind, largely concealing the taller volume and grouping the more visually prominent grey cladding to the north, adjacent to the existing buildings in the port.

4.2.5 Clad in the light grey, the top of the boiler house would be visible from the long distance views in the AONB and WHS. If detailed correctly, this could look like an exposed limestone cliff face, as visible just below The Verne at the top of the East Weare escarpment.

4.2.6 The height of the boiler house coincides with a plateau halfway up the undercliff giving further justification to the positioning of this new 'exposed limestone cliff face'.



View from Balaclava Bay

View from Sandsfoot Castle indicative views in context

View from northern shipping lane

FIG 4.4
MATERIAL COMPOSITION OPTION 2 - GREEN CLADDING TREATMENT TO THE FRONT

BUILDING ENVELOPE - FACADE DEVELOPMENT

4.3 MATERIAL DETAILING - HORIZONTAL BANDING

4.3.1 As described above the articulation and selection of materials creates a horizontal band of white/grey cladding that replicates the exposed limestone cliff face at the top of the escarpment.

4.3.2 To pick up on the character of the exposed cliff face, and enliven the design of this elevated section of the building, and western elevation to Incline Road, the design has drawn inspiration from the geological stratification found in the exposed cliff and quarry faces of the Isle of Portland.

CLADDING AN 'EXPOSED LIMESTONE CLIFF FACE'

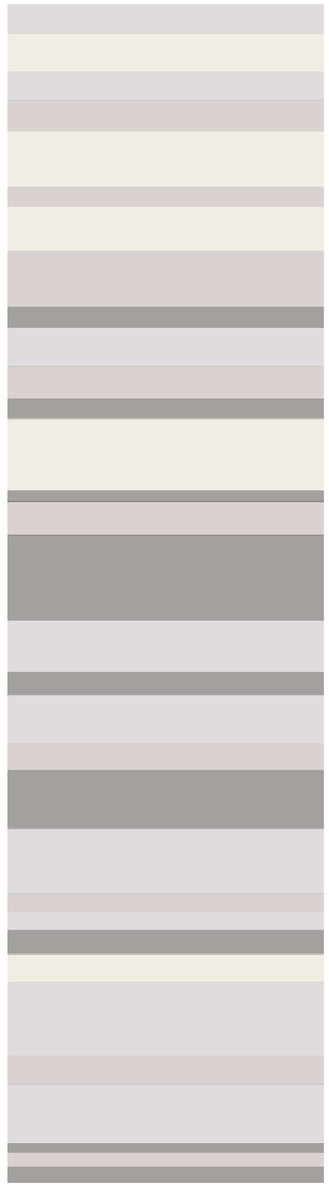
4.3.3 It is proposed that the cladding of the boiler and Exhaust Air Filtration Hall will include an abstract interpretation of the limestone cliff faces which have been created by the sedimentary settlement process millions of years ago and more recently by coastal erosion.

4.3.4 The options on the following pages demonstrate various options that have been considered to reflect the horizontal banding of various depths that are visible in the exposed faces of the limestone.

4.3.5 Later options look at how the finer vertical cleave lines might also be represented in the design of the facade to provide a finer grain and texture to the elevations.

4.3.6 The selection of the materials should reflect the chalky texture of the limestone meaning the use of a fibre cement board or a matt finished painted metal panel/sheet.

Limestone cliff face



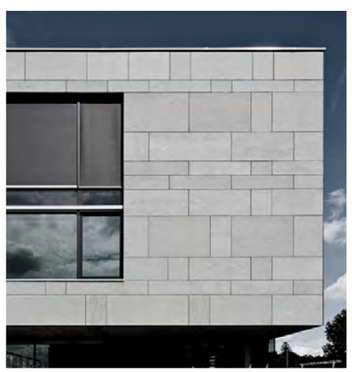
Cliff colours

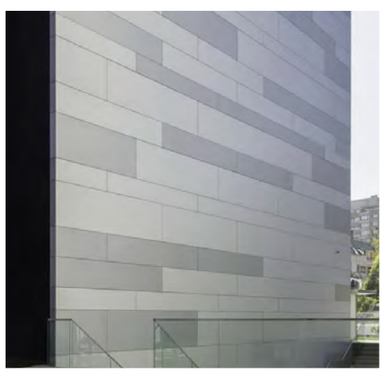
Cliff strata

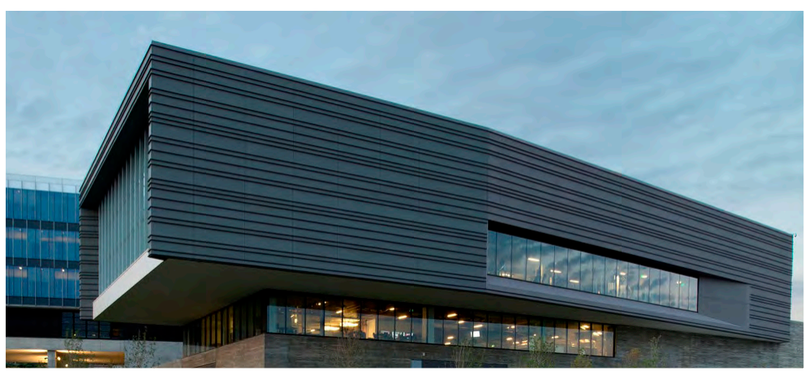
FIG 4.5
PORTLAND GEOLOGICAL FORMATION - CLIFF FACE ADJACENT TO PORTLAND BILL

FIG 4.6
CLIFF FACE ENLARGEMENT- GEOLOGICAL STRATA

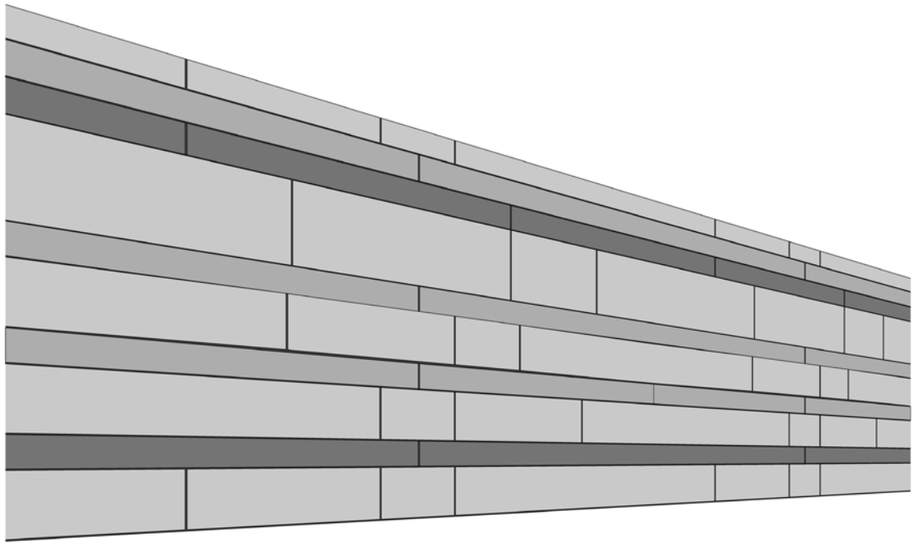
4.9 BUILDING ENVELOPE - FACADE DEVELOPMENT / MATERIAL DETAILING - HORIZONTAL BANDING



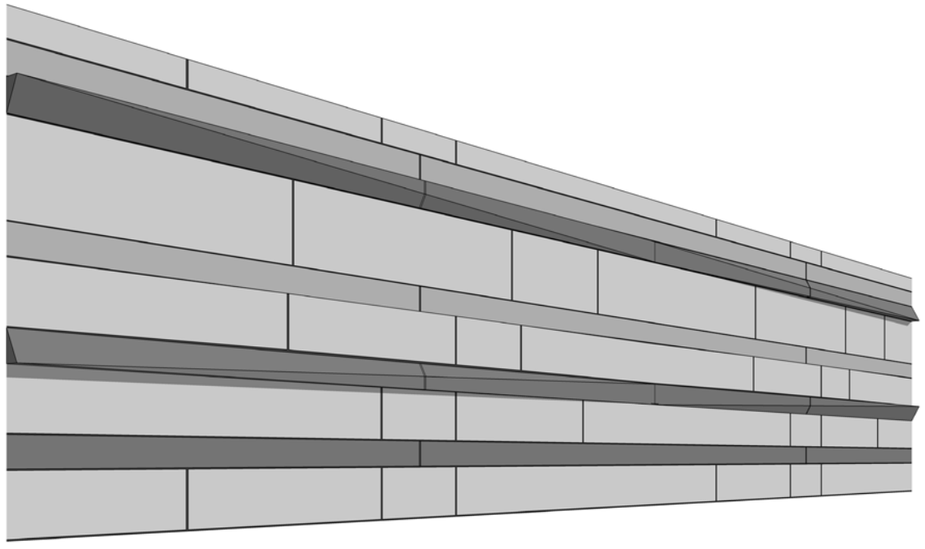




STRATIFICATION:
HORIZONTAL BANDING

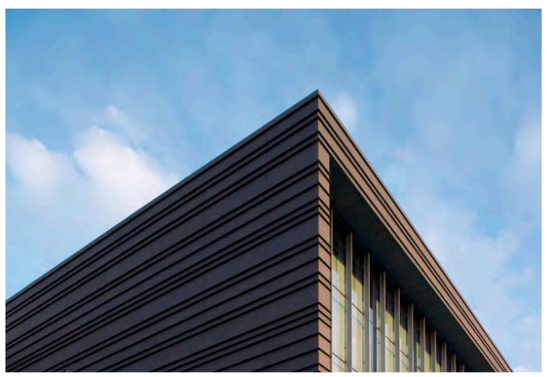


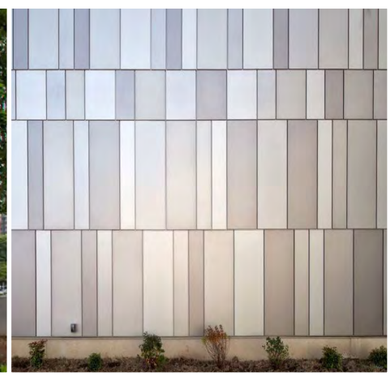
HORIZONTAL BANDING OPTION 1:
PARALLEL STACK BONDED BANDS OF VARIOUS HEIGHTS

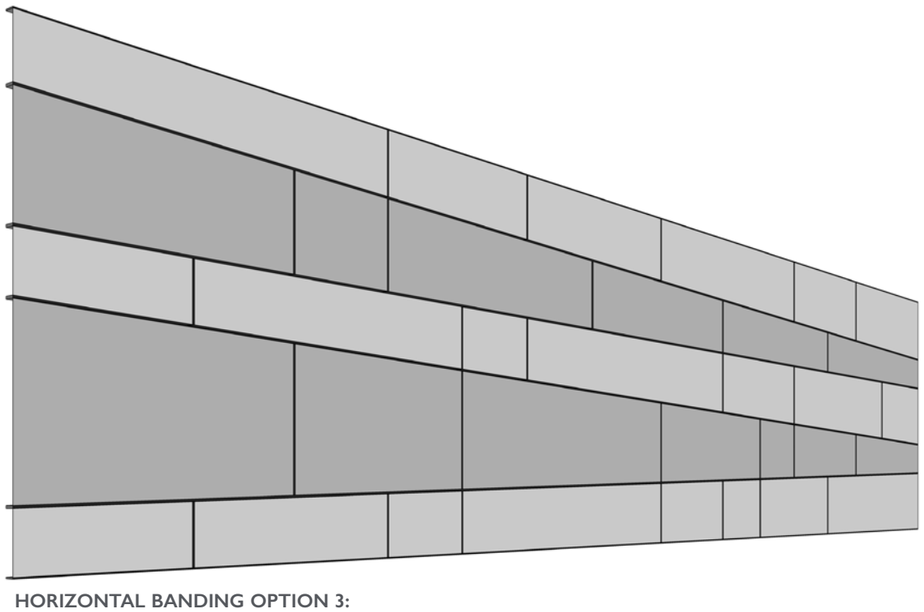


HORIZONTAL BANDING OPTION 2:
PARALLEL STACK BONDED BANDS OF VARIOUS HEIGHTS AND RAISED FISSURES

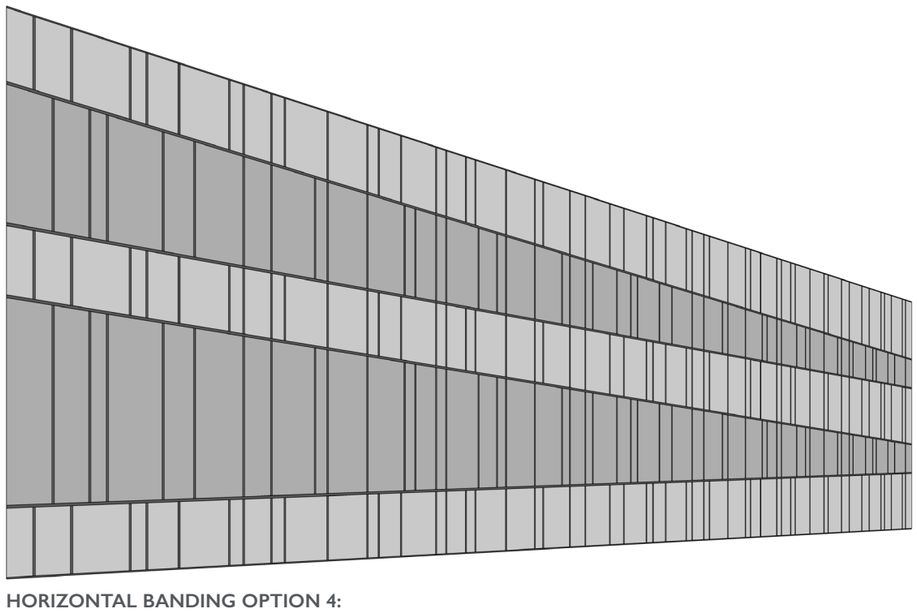
FIG 4.7
GREY CLADDING FACADE IDEAS DEVELOPMENT





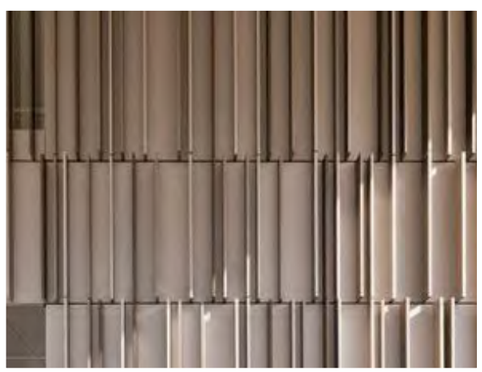


HORIZONTAL BANDING OPTION 3:
TAPERED STACK BONDED BANDS OF VARIOUS HEIGHTS

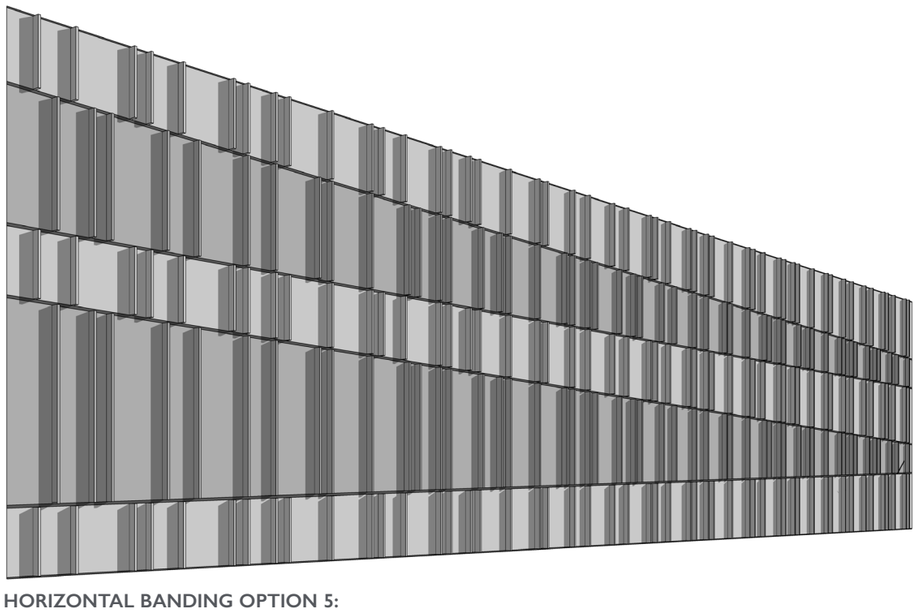


HORIZONTAL BANDING OPTION 4:
TAPERED HORIZONTAL BANDS COMPRISING VERTICAL CLEAVE LINES

4.9 BUILDING ENVELOPE - FACADE DEVELOPMENT / MATERIAL DETAILING - HORIZONTAL BANDING

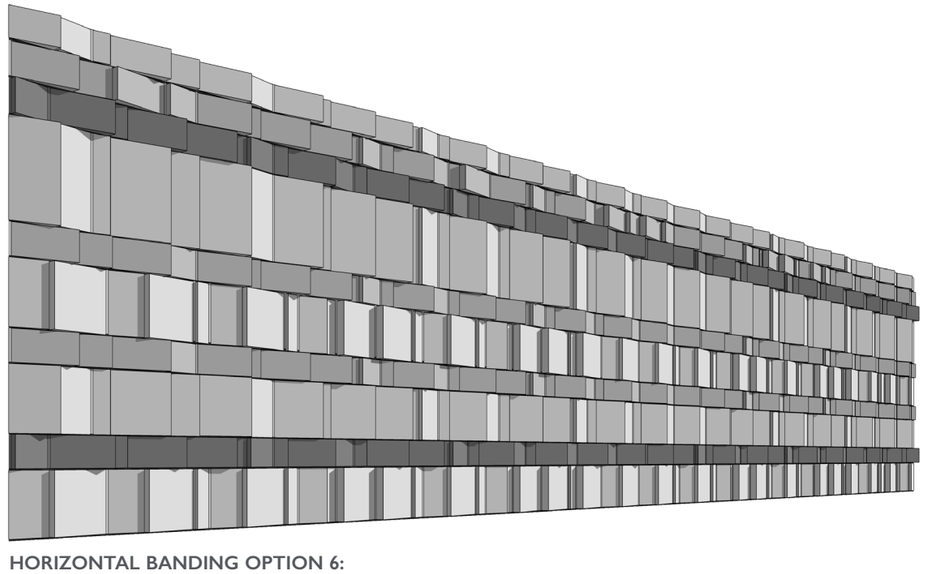


STRATIFICATION:
ADDITIONAL VERTICAL GEOMETRY



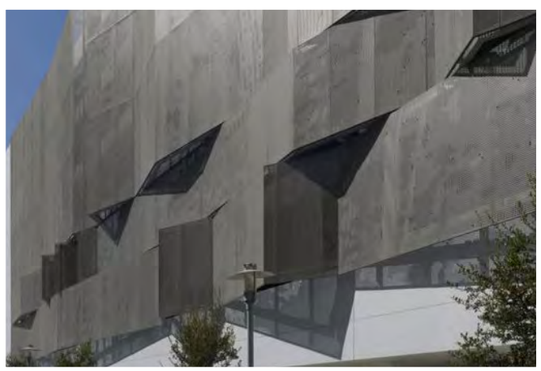
HORIZONTAL BANDING OPTION 5:
HORIZONTAL BANDS WITH PROTRUDING CLEAVE LINES

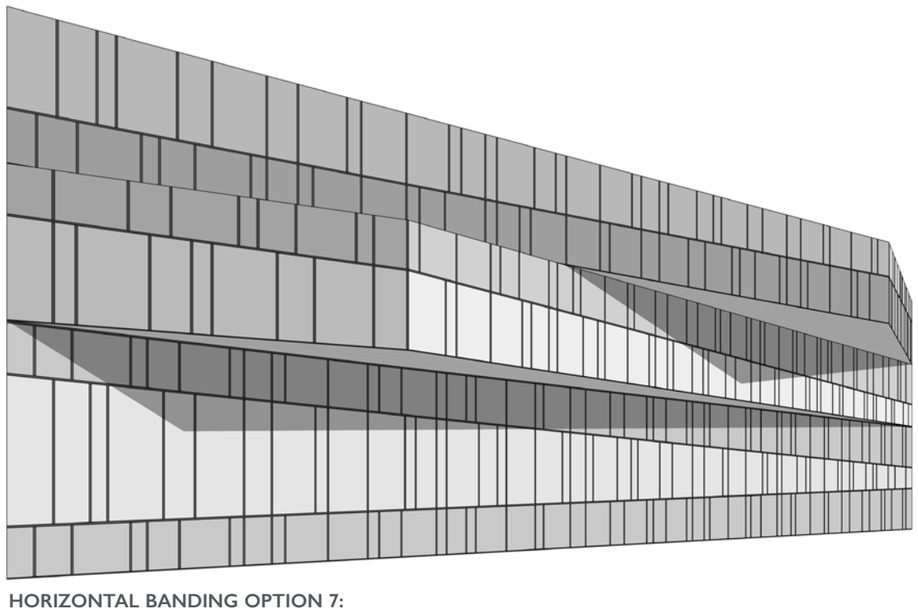
PREFERRED CONCEPT IDEA TO BE DEVELOPED FURTHER



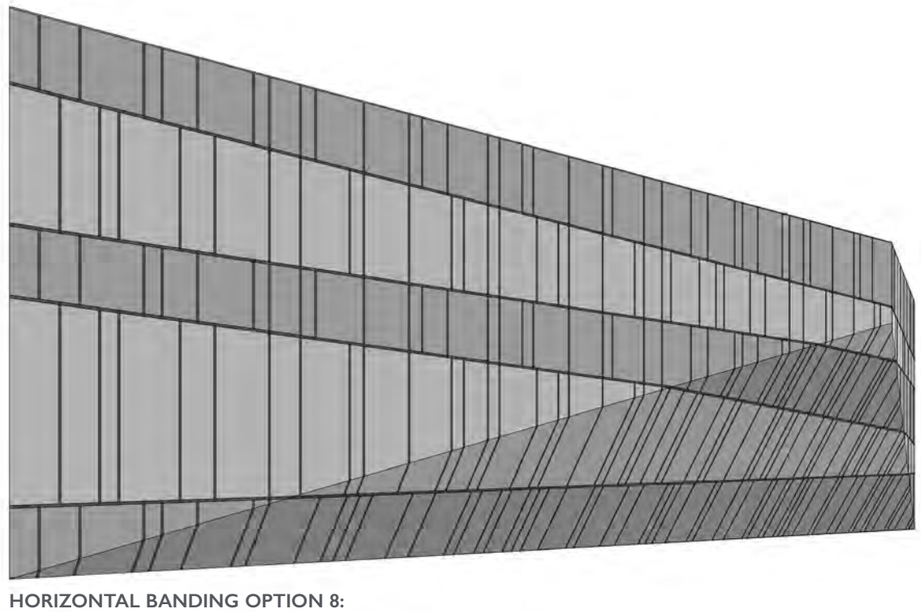
HORIZONTAL BANDING OPTION 6:
HORIZONTAL BANDS COMPRISING ANGLED CLEAVE LINES

FIG 4.8
GREY CLADDING FACADE IDEAS
DEVELOPMENT



HORIZONTAL BANDING OPTION 7:
FOLDED STRATA BANDS



HORIZONTAL BANDING OPTION 8:
FACETED BUILDING FACADE WITH TAPERED HORIZONTAL BANDING

4.0 BUILDING ENVELOPE - FACADE DEVELOPMENT / MATERIAL DETAILING - HORIZONTAL BANDING

4.3.7 The preferred horizontal banding cladding option is Option 6: Horizontal Bands Comprising Angled Cleave Lines.

4.3.8 In this option the height of each horizontal band remains consistent along its length although the height of the bands varies across the height of the building, as with the rock strata visible on the Portland cliff faces and quarries.

4.3.9 This is further emphasised through subtle changes in colour for each horizontal band reflecting the changes in the sedimentary composition through the height of the limestone.

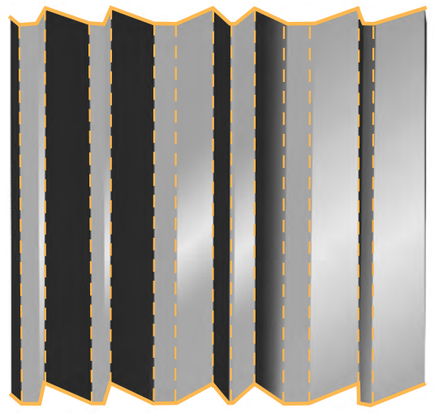
4.3.10 Whilst the proposed banding and colour is similar to Options 1, 2 and 5, Option 6 provides additional depth to the elevation through the use of angled façade panels. The crease lines of the panels replicate the vertical cleave lines of the cliff faces, whilst the angled faces play subtly with the light and shade as it falls across the surface of the building, creating a visual depth and interest to the elevation.

4.3.11 It is proposed that the external walls will be constructed from a built-up wall system utilising a profiled metal sheet as the external weatherproof layer of the façade. The sheets, which are available in lengths of up to 7m, would consist of peaks and troughs of various widths and depths and would be flipped and rotated in various combination to avoid noticeable repetition over the length of the building.

4.3.12 A horizontal drip flashing at the top of each band will visually create a strong, continuous line that will further accentuate each band when viewed from a distance.

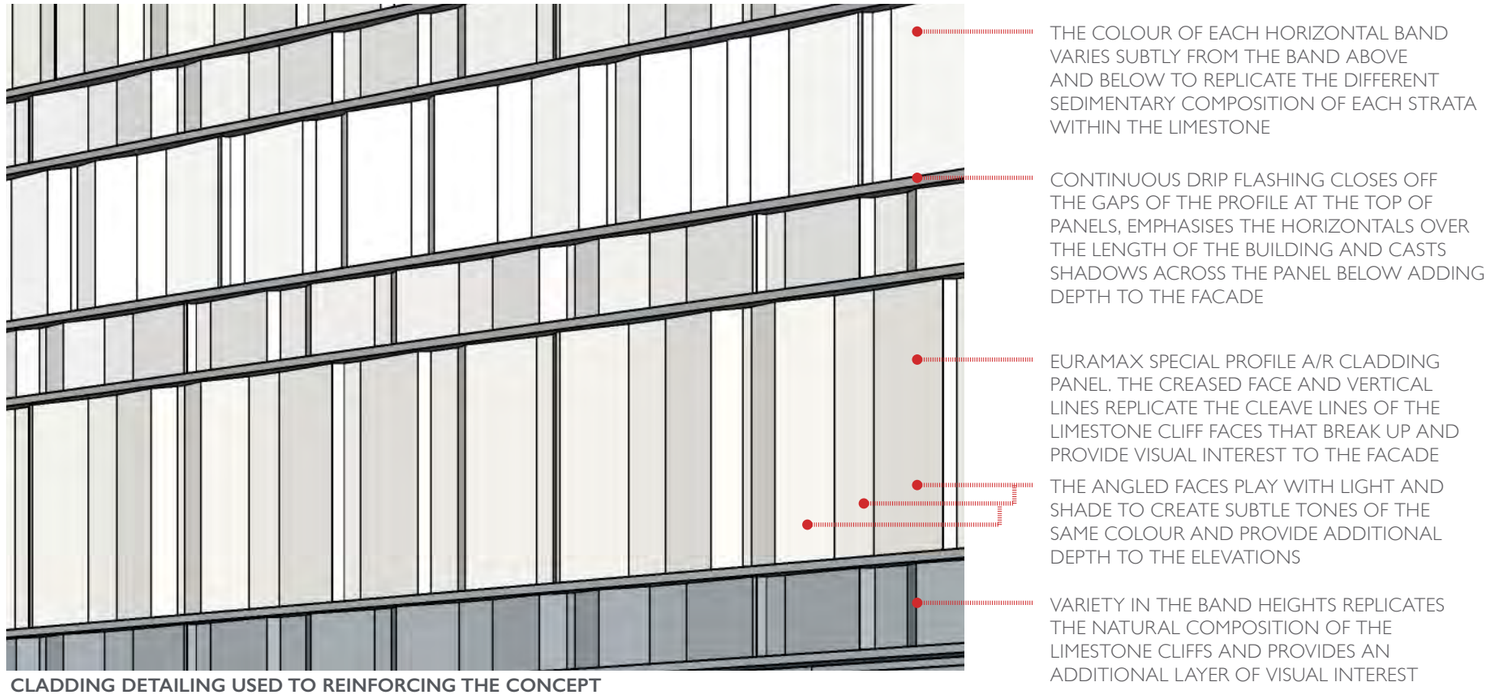
4.3.13 The polyester powder coated finish of the profiled sheet will be specified to pick up on the colours and tones found naturally in the exposed limestone cliff face of the island. These will be provided with a matt finish to avoid undesirable glare or reflections.

SEDIMENTARY BANDING AND VERTICAL CLEAVE LINES
PORTLAND CLIFF FACE EXTRACT



EURAMAX SPECIAL PROFILE A/R
PROFILED METAL CLADDING SHEET

KOPVAN KESSEL -
EURAMAX SPECIAL PROFILE A/R



CLADDING DETAILING USED TO REINFORCING THE CONCEPT
OPTION 6 FACADE DEVELOPMENT STUDY

FIG 4.9
PRECEDENT EXAMPLE OF DEEP PROFILE GREY CLADDING

FIG 4.10
FACADE CONCEPT DEVELOPMENT

4.3 BUILDING ENVELOPE - FACADE DEVELOPMENT / MATERIAL DETAILING - HORIZONTAL BANDING

4.3.14 The above facade development option creates a striking feature with the depth of the panel creating strong shadows that will vary in length throughout the day and at different times of year.

4.3.15 To ensure that this is not too abstract in its interpretation of the limestone strata a further option has been considered, as demonstrated to the right.

4.3.16 This option utilises a combination of shallower profiles. The narrower width of the vertical features creates a subtler texture to the facade of the building more in keeping with the texture of the cliff face.

4.3.17 Unlike the previous option, a combination of three different profiles are used to avoid monotony or noticeable repetition across the facade. Grouping similar profiles allow both intensification or relief from shadows which allows a further layer of variety to be added to the elevation.

4.3.18 Whilst this option would create variation across the width of the facade the effect is almost too subtle to provide suitable articulation and depth to the facade.

4.3.19 The deeper profile shown on the previous pages has therefore been selected for the final design as the depth of the panel will create a play of light and shadow that will replicate a visible cleave effect when viewed from close and mid distance views from within the port and harbour beyond.

4.3.20 In the longer distance views the 'cleave' effect will become less visible but the variation in colour of the horizontal bands will still be visible, as naturally occurs with the limestone strata exposed at Portland Bill and around the perimeter of the Isle of Portland.

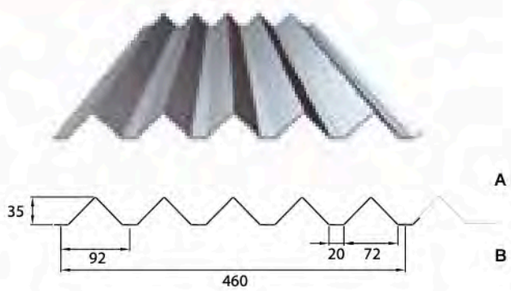
SHALLOW PROFILED CLADDING COMBINATIONS AND GROUPINGS
PRECEDENT PROJECT

SUBTLE VERTICAL FEATURES CREATING DEPTH AND RELIEF TO THE FACADE
PRECEDENT PROJECT

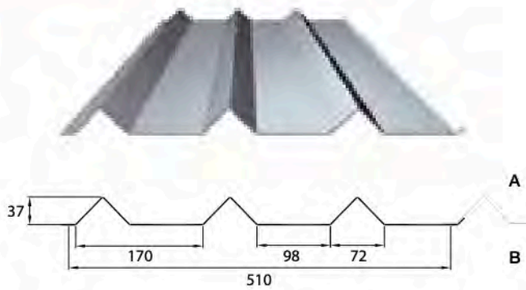
SPECIAL PROFILE A/R
COLORCOAT PRISMA CONFIDEX- CLADDING COLOURS

FIG 4.11
GREY CLADDING OPTION 2 PRECEDENT IMAGES

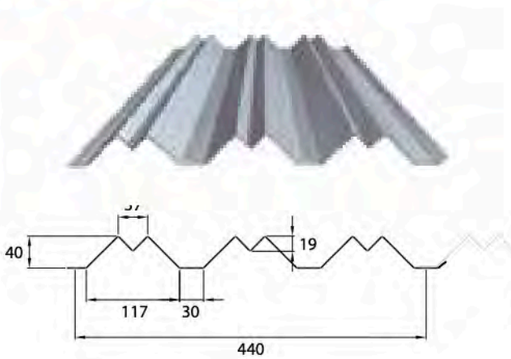
SAB-Pyramid 37/460



SAB-Pyramid 37/510



SAB-Diamond® 40/440



SPECIAL PROFILE A/R
SAB-PROFILE CLADDING PROFILES

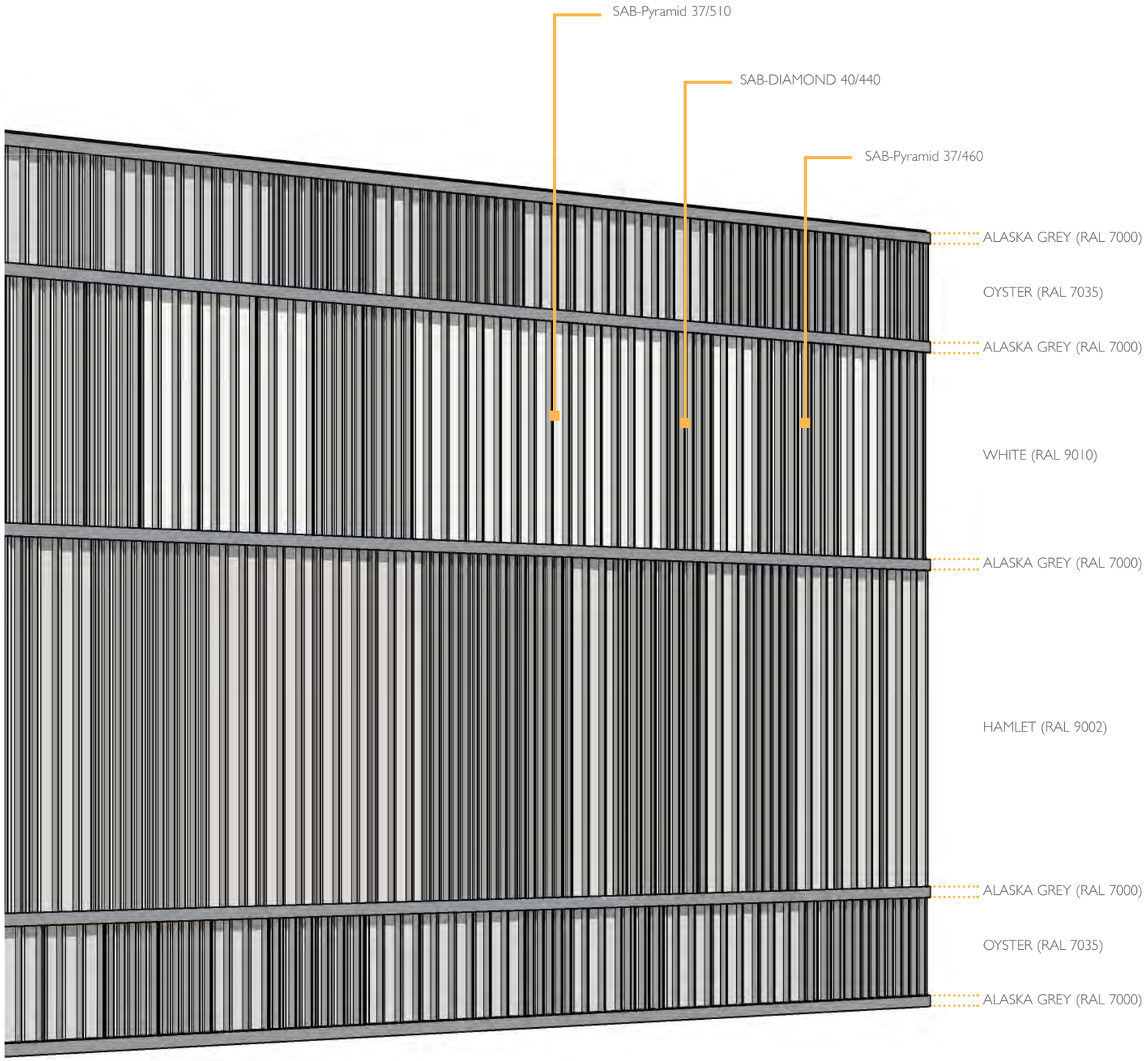


FIG 4.12
GREY CLADDING OPTION 2 - CLADDING PROFILE COMPOSITION

BUILDING ENVELOPE - FACADE DEVELOPMENT

4.4 FACADE DEVELOPMENT - LOUVRED PLINTH

CONTAINING ODOURS

4.4.1 To prevent odours escaping from the RDF store the building will use the heat of the boiler room to draw air out of the RDF store and maintain the space in negative pressure.

4.4.2 As air is drawn out of the space, new air needs to be drawn into the space around the perimeter of the facade.

BOILER AIR SUPPLY AND COOLING

4.4.3 To ensure the efficient incineration of the RDF there needs to be a constant air supply to the boiler room.

4.4.4 Additional air flow is also required to help regulate the temperature of the boiler room and so extensive areas of ventilation openings are required to the elevation of the boiler room.

VENTILATION TO SERVICE AREAS

4.4.5 Ventilation is required to a number of other plant areas around the perimeter of the building. These areas include the transformer rooms, Turbine Hall and battery rooms.

A CONSISTENT AESTHETIC

4.4.6 As ventilation is required to so many areas of the building to fulfil the technical requirements of the building function, the elevations will need careful consideration to avoid becoming a patchwork of louvre panels.

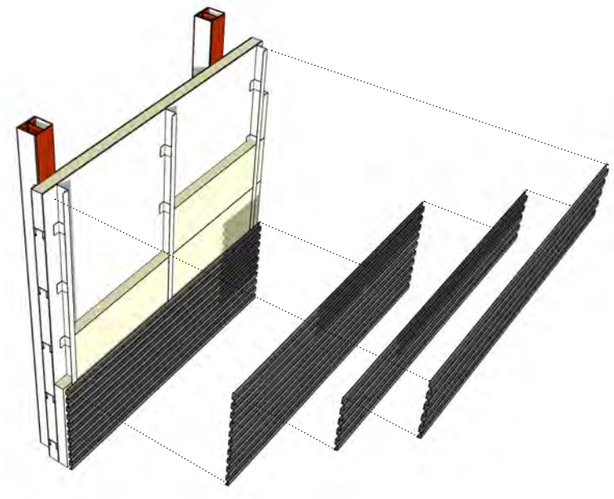
4.4.7 To avoid this it is proposed that a continuous louvred external envelope is provided to the first 6m of the elevation.

4.4.8 This continuous band around the bottom of the building would provide a continuous aesthetic that would help ground the building from long distance views in a similar way to the water stained lower strata of the limestone cliffs found around the southern tip of the island by Portland Bill.

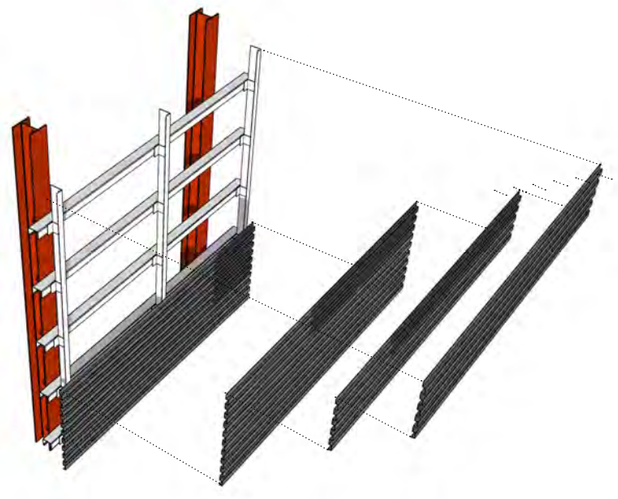
4.4.9 In the occupied areas of the building which need to be heated and comply with the UK Building Regulations the wall will be constructed from a built up wall system with a profiled metal sheet to form the external weathering face of the building.

4.4.10 In the non-occupied areas a combination of built up wall system and continuous louvred wall would be utilised. The colour and external profile of the cladding sheet and louvres would match providing a continuous external aesthetic whilst allowing ventilation to be provided in all the appropriate locations.

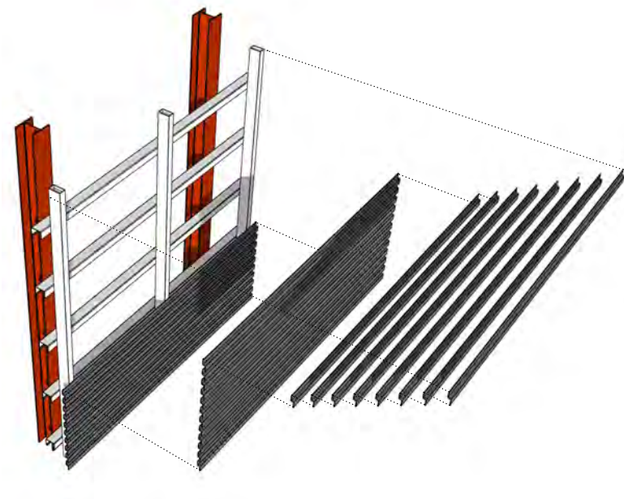
4.4.11 The industrial roller shutter doors that provide access and the exit from the RDF store for deliveries sit neatly into this band, with the horizontal components of the roller shutter door mirroring the horizontal ribs of the surrounding cladding.



BUILT UP CLADDING: PROFILED SHEET TO INSULATED AREAS HORIZONTAL LOUVRED PLINTH



BUILT UP CLADDING: PROFILED SHEET TO UNINSULATED AREAS



LOUVRED FACADE: VENTILATION TO RDF STORAGE AREAS

FIG 4.13
LOUVRE PLINTH COMPONENTS

CONTINUOUS LOUVRE WALL SYSTEMS

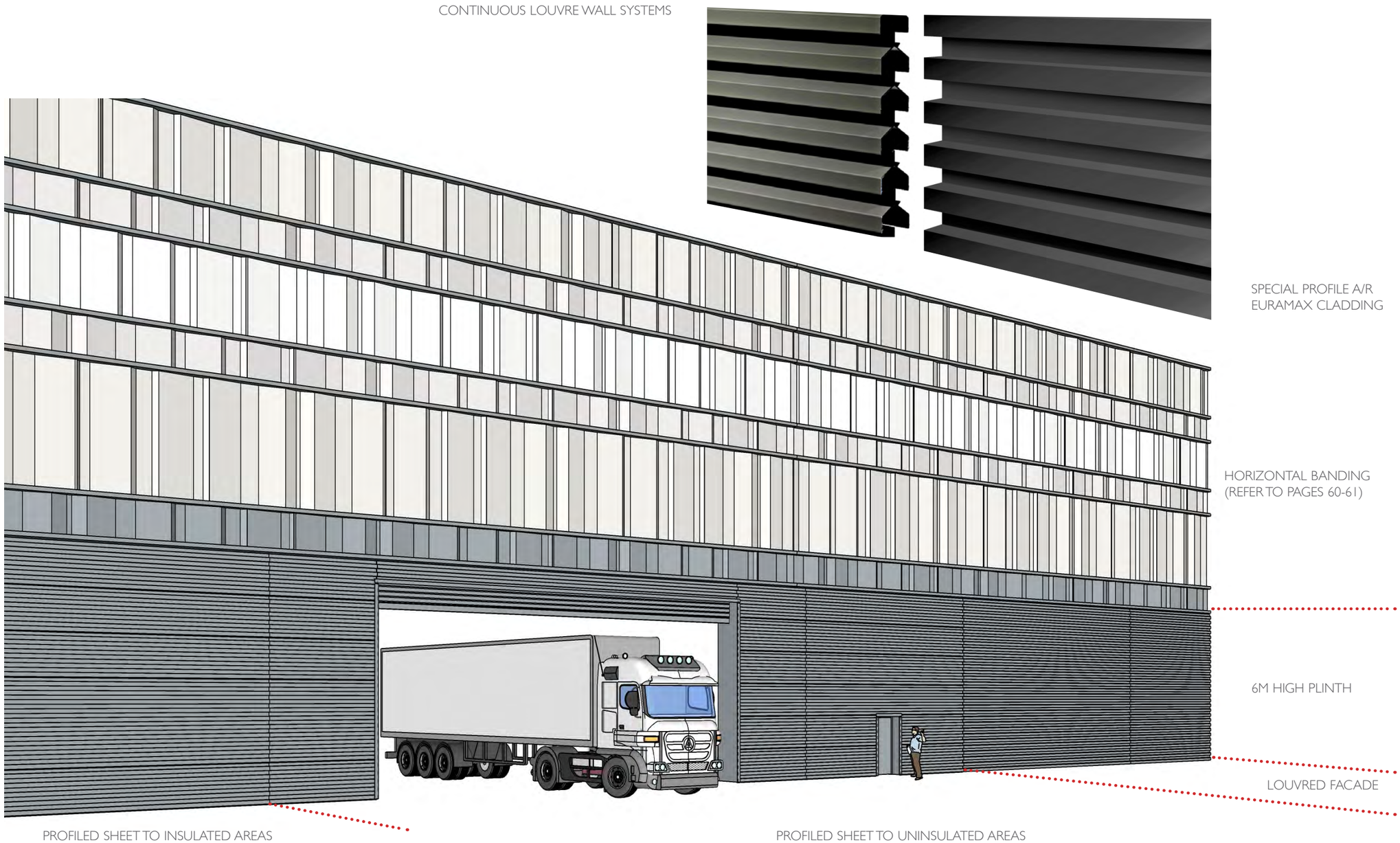


FIG 4.14
LOUVRED PLINTH - CONTINUOUS AESTHETIC

BUILDING ENVELOPE - FACADE DEVELOPMENT

4.5 'GREEN' WALL - OPTION 1 GREEN CLADDING

4.5.1 The simplest and most cost effective solution to create a recessive building would be to use a dark, matt green/brown cladding on the building which picks up on the tone of the scrub vegetation.

UPPER OSPREY GLENCORE

4.5.2 This was the approach adopted for the Upper Osprey Glencore application located just to the south along the Portland coast. Here 3 tones of cladding and a dark grey roof all contribute to the recessive appearance of the proposed industrial sheds.

4.5.3 The Upper Osprey Glencore application visualisations demonstrate the relative success of this approach. However, the flat tone of the façades means that, whilst the buildings do not visually jump out, they are still clearly identifiable from the AONB, WHS and from views within Weymouth Bay and Portland Harbour.

4.5.4 As the proposed ERF building will be larger than the Upper Osprey Glencore application a lack of tonal variation is likely to further accentuate the visibility of the proposals.

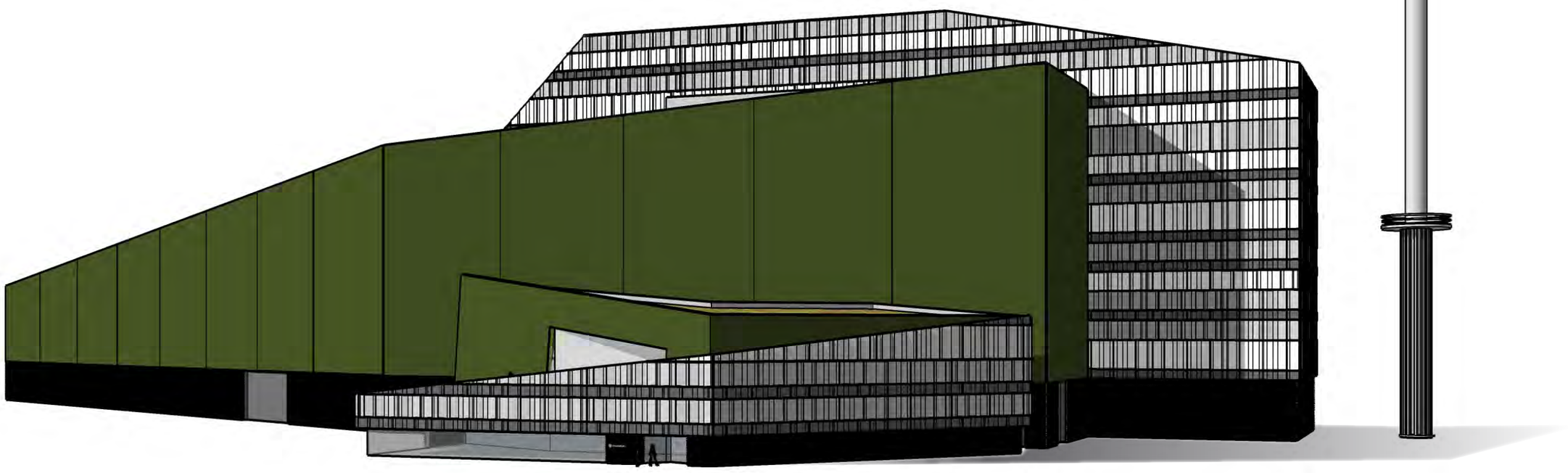
IMPROVING TONAL DIVERSITY

4.5.5 The remaining green wall options look at different approaches that could provide greater tonal diversity and improve how the building blends in with the landscape when viewed from the visually sensitive locations within the AONB and WHS to the east of the site.

VIEW OF UPPER OSPREY GLENCORE FROM SEA

VIEW OF UPPER OSPREY GLENCORE FROM SOUTH WEST COAST PATH NEAR THE YOUNG OFFENDERS INSTITUTE
UPPER OSPREY GLENCORE APPLICATION - LVIA COLOUR RENDERED VISUALISATIONS

FIG 4.15
UPPER OSPREY GLENCORE SUBMITTED LVIA VISUALISATIONS



INDICATIVE VIEW OF THE PROPOSALS USING A DARK GREEN CLADDING SIMILAR TO THAT OF THE UPPER OSPREY GLENCORE APPLICATION

WALLS - NORTHERN SECTIONS OF WAREHOUSE A FRONT SOUTHERN SECTION OF WAREHOUSE B

COVERWORLD - PLASTISOL RANGE
OLIVE GREEN (BS 12B27)

WALLS - CENTRAL SECTIONS OF ELEVATION

COVERWORLD - PLASTISOL RANGE
JUNIPER GREEN (BS 12B29)

WALLS - REAR SOUTHERN SECTION OF WAREHOUSE B

COVERWORLD - PLASTISOL RANGE
VAN DYKE BROWN (BS 08B29)

ROOF

BRIARWOOD PRODUCTS - MEADOWSCAPE RANGE
DARK GREY ANTHRACITE

FIG4.16
GREEN CLADDING OPTION 1 - COMPOSITION AND COLOURS

FINAL MATERIAL PALETTE FROM THE UPPER OSPREY GLENCORE APPLICATION

BUILDING ENVELOPE - FACADE DEVELOPMENT

4.6 'GREEN' WALL - OPTION 2 LIVING WALL

4.6.1 This option utilises a living green wall to camouflage the bulk of the building from the long distance views in the AONB and WHS to the east.

4.6.2 Through the use of suitable hardy, marine environment plant species, as indicated on the facing page, the living wall would still create a striking landmark feature for observers close by such as visitors arriving in the port by sea.

4.6.3 The introduction of additional planting would have the potential for ecological improvements to this brownfield site.

4.6.4 Whilst it is technically possible to establish a living green wall in this harsh marine environment the selection of this option was discounted for the following reasons:

- any issues with establishing/maintaining plant growth in the first few years, or indeed over the life of the building, could result in a compromise to the desired camouflage effect;
- the colour of suitable marine hardy species would not be an ideal match for the lichen and scrub planting found on the East Weare escarpment;
- the initial capital expenditure, and on going maintenance cost, would not be financially viable for a building of this type.

HANGING SUBSTRATE AND IRRIGATION PIPES
LIVING WALL DETAIL

HOVE, BRIGHTON
MARINE ENVIRONMENT LIVING WALL PRECEDENT EXAMPLE

FIG 4.17
GREEN CLADDING OPTION 2 - PRECEDENT IMAGES

HARDY MARINE ENVIRONMENT
LIVING WALL PLANT SPECIES
(SPECIES SELECTION USED AT HOVE, BRIGHTON)

FIG 4.18
GREEN CLADDING OPTION 2 - MARINE HARDY PLANT SPECIES

BUILDING ENVELOPE - FACADE DEVELOPMENT

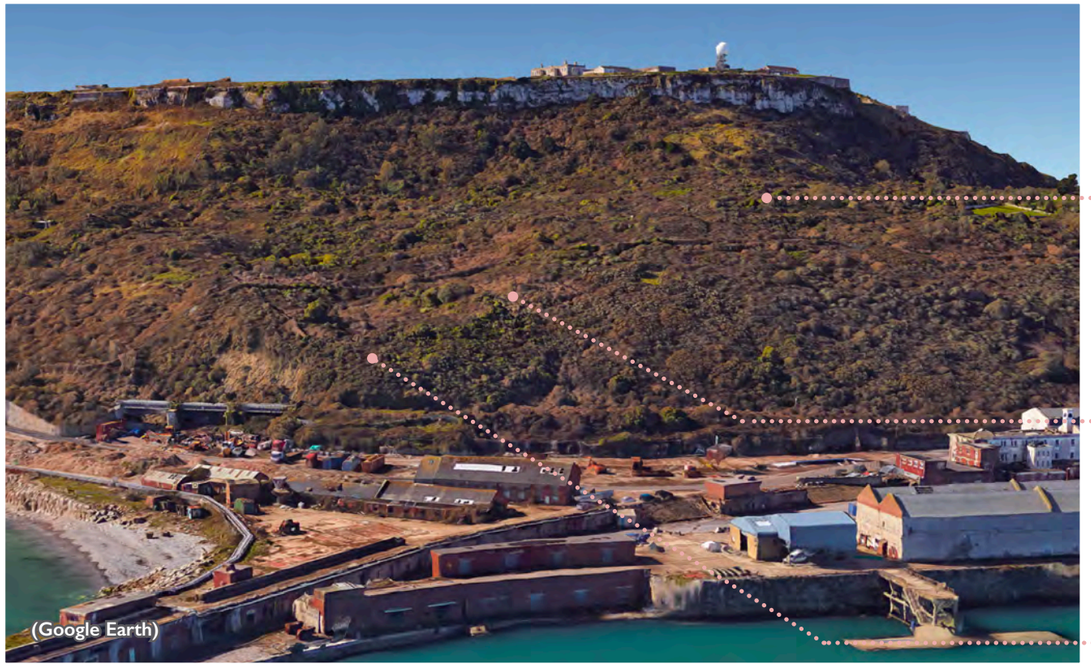
4.7 ‘GREEN’ WALL - OPTION 3 PPC ANGLED BLADES

4.7.1 This option creates a camouflage effect by utilising an array of folded, polyester powder coated metal blades that are mounted onto vertical rails fixed to the building’s external envelope.

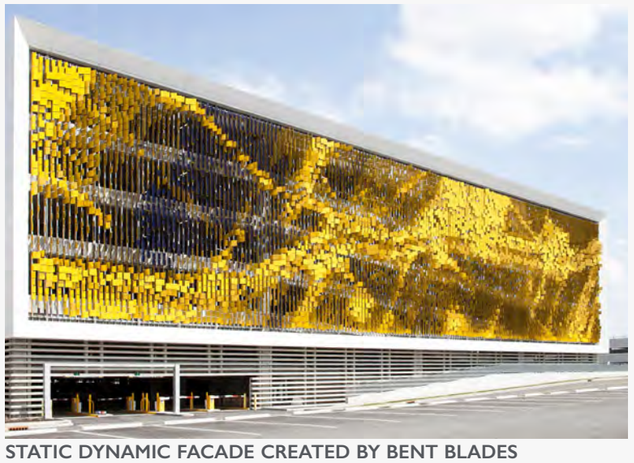
4.7.2 Using an image of East Weare a selection of colours typical of the cliff face behind have been selected. A base tone is created by the ‘Dark Green’ cladding that encloses the building. The blades, which are bent to a variety of angles, are then coloured ‘Light Brown’ on the left hand face and ‘Dark Brown’ on the right hand face to create mottled colour similar to the vegetation found lining the lower escarpment.

4.7.3 Whilst fixed, the variation of blade angle and face colour creates subtle plays of light that produce a dynamic facade that changes colour with the location of the observer, as can been seen from the selection of views to the far right.

4.7.4 Whilst this creates a dynamic camouflage the arrangement of bent louvres would result in turbulent air coming off the building which would disrupt the dispersion of the exhaust air from the stack. This option was therefore discounted.

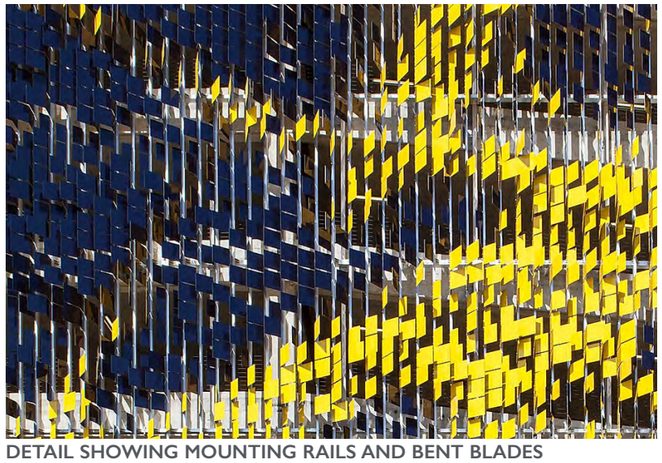


VIEW ACROSS WEYMOUTH BAY SHOWING THE TONES AND COLOURS VISIBLE FROM THE AONB

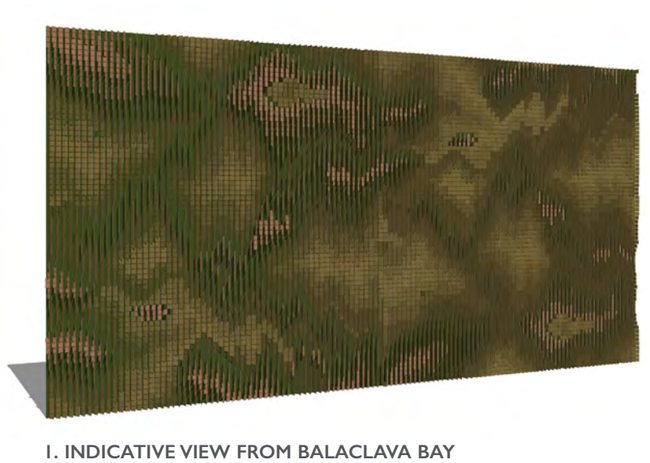


STATIC DYNAMIC FACADE CREATED BY BENT BLADES
ESKENAZI HOSPITAL PARKING STRUCTURE

FIG 4.19
PRECEDENT IMAGE

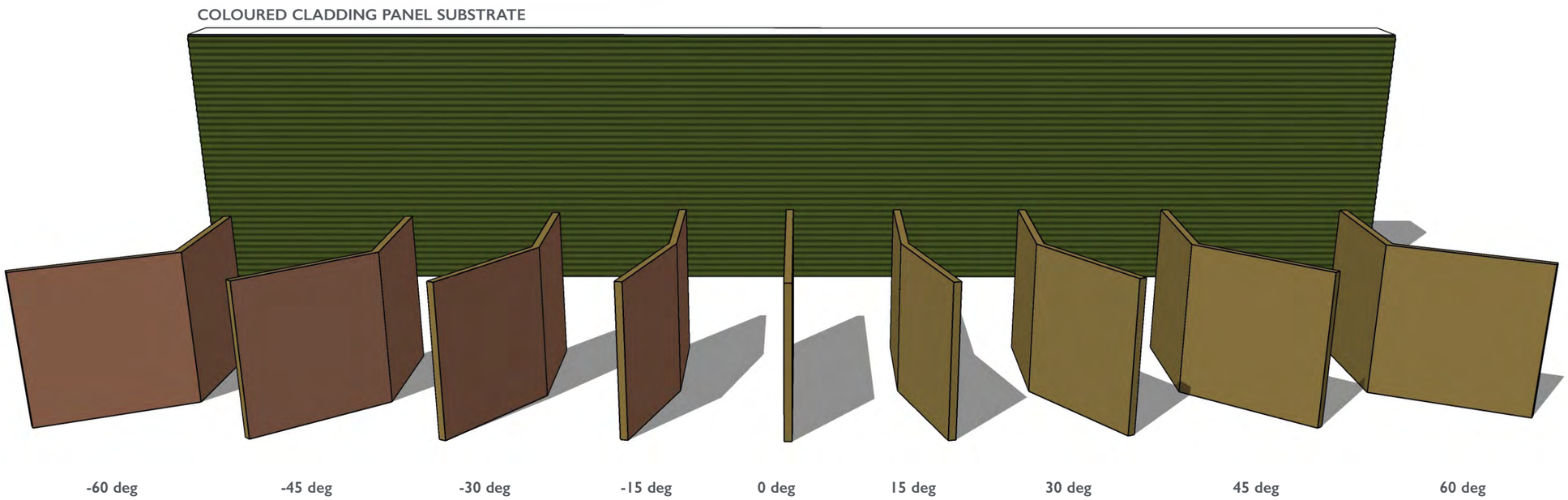


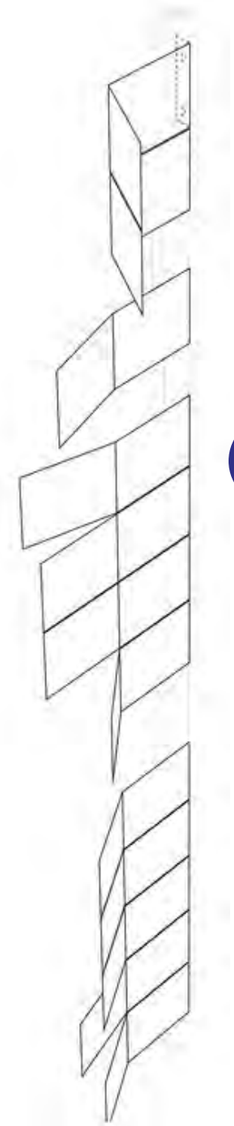
DETAIL SHOWING MOUNTING RAILS AND BENT BLADES



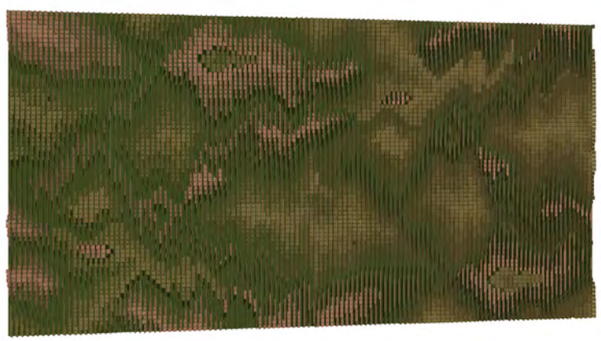
1. INDICATIVE VIEW FROM BALACLAVA BAY
30 X 15M SAMPLE PANEL WITH SITE COLOURS

FIG 4.20
GREEN CLADDING OPTION 3 - BLADE COMPOSITION AND COLOUR

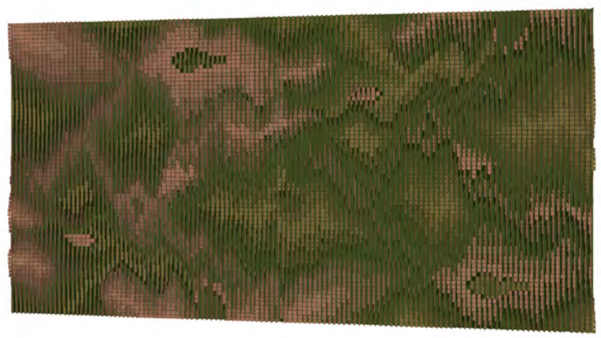




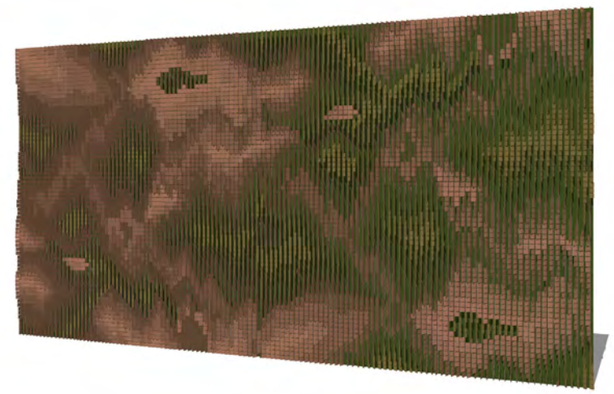
STATIC DYNAMIC FACADE: COMPONENT PARTS



2. INDICATIVE VIEW FROM SOUTHERN SHIPPING CHANNEL



3. INDICATIVE VIEW FROM DEEP WATER BERTH



4. INDICATIVE VIEW FROM PORTLAND HARBOUR

BUILDING ENVELOPE - FACADE DEVELOPMENT

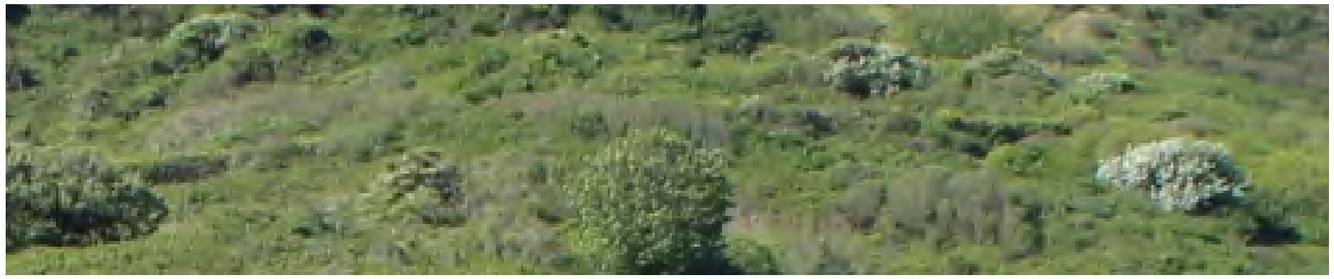
4.8 'GREEN' WALL - OPTION 4 PRINTED FACADE

4.8.1 With advances in technology it is now possible to wrap buildings with a printed image allowing the building to seamlessly blend with its surroundings.

4.8.2 In a technique sometimes known as 'trompel'oeil'. a high resolution image of the East Weare escarpment, or camouflage pattern with similar tones, could be incorporated into the façade design of the building.

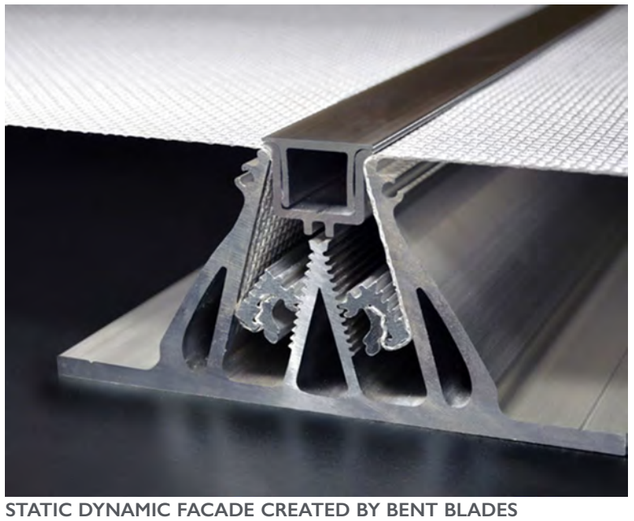
4.8.3 This could be achieved through the use of a printed heavy-duty, PVC mesh (320gsm) stretched tightly over a frame or a vinyl wrap applied directly to the external cladding panel. Both options utilise solvent UV inks which ensures photo-realistic quality and long-lasting outdoor colour performance.

4.8.4 As demonstrated on the following pages this option provided the best camouflage from long distance views in the AONB and so is the preferred option for the final proposals.



HIGH RESOLUTION IMAGE OF EAST WEARE: TAKEN FROM PORTLAND HARBOUR FOR USE AS BUILDING WRAP

RICE UNIVERSITY – CAMBRIDGE OFFICE BUILDING GARAGE - PRINT OF THE 'LOCAL OAK GROVE'



STATIC DYNAMIC FACADE CREATED BY BENT BLADES
ESKENAZI HOSPITAL PARKING STRUCTURE

FIG 4.21
OPTION 4 PRINTED FACADE - PRECEDENT IMAGES


PELCKMANS

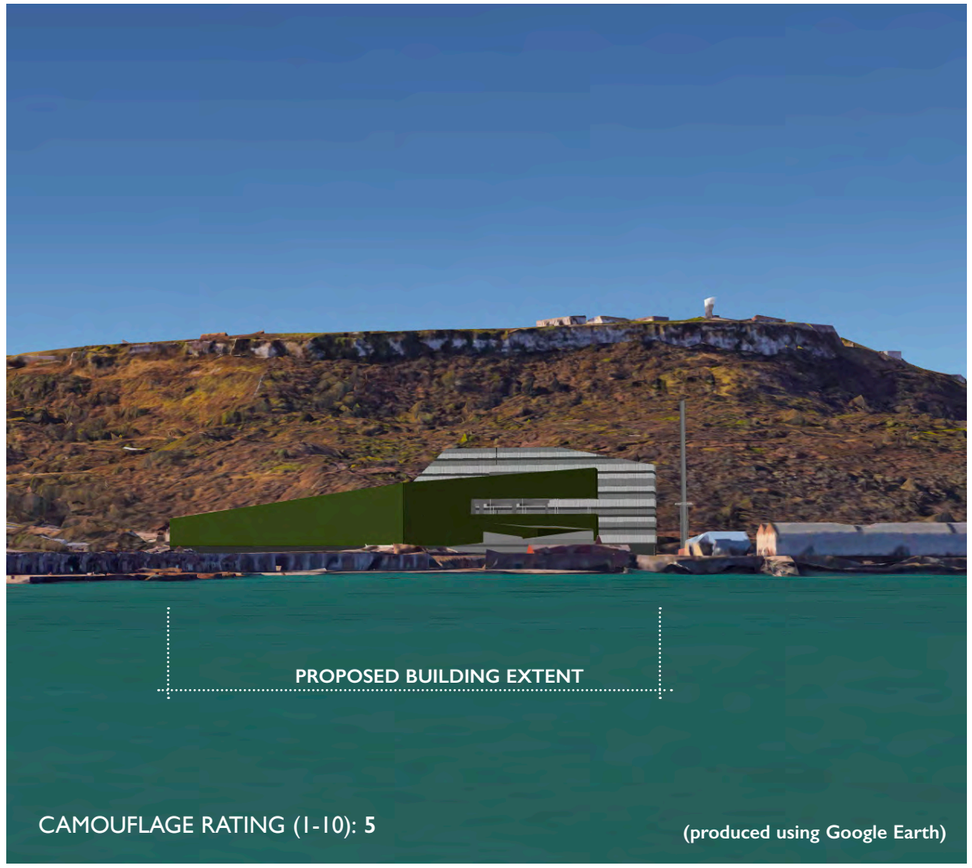
BUILDING ENVELOPE - FACADE DEVELOPMENT

4.9 ‘GREEN’ WALL - OPTIONS IN CONTEXT

OPTION 1 - DARK GREEN CLADDING

4.9.1 Whilst previously accepted on the Upper Osprey application the use of a single colour on the flat elevational planes stands out against the variation in colour of the vegetation behind.

4.9.2 This reduces the effectiveness of the camouflage and results in the full extent of the building’s mass being visible from the harbour, bay and AONB further to the east.



OPTION 2 - LIVING GREEN WALL

4.9.3 The living green wall provides the variety of colour missing in the first option but due to the limitation of the green wall technology, growing substrate and available selection of plant species hardy enough to sustain the harsh marine environment it would be impossible to achieve a good colour match for the vegetation that currently grows on the cliff face of East Weare.

4.9.4 The harsh coastal environment may require substantial time to successfully establish and may have ongoing issues in maintaining healthy plants, potentially reducing the effectiveness of the camouflage effect over the lifespan of the building.

FIG 4.22
GREEN WALL OPTIONS VIEWED ACROSS PORTLAND HARBOUR

OPTION 3 - PPC ANGLED BLADES

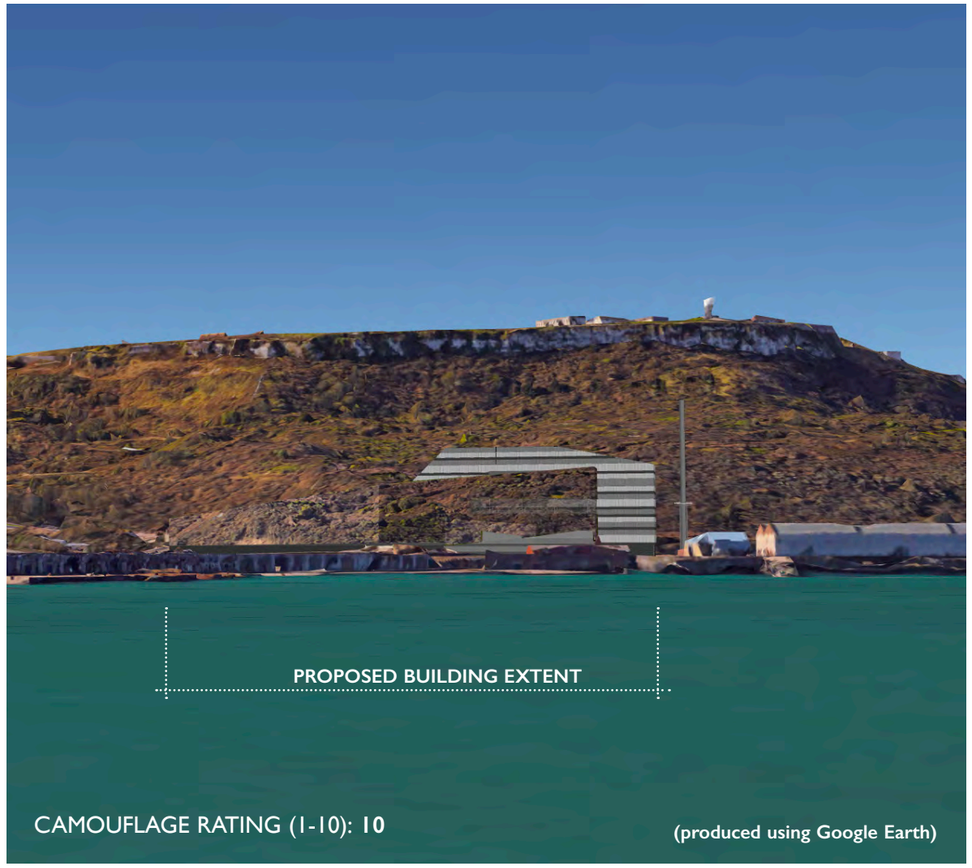
4.9.5 As demonstrated below the coloured blades create both the desired variation in colour and the longevity desired from the camouflaging effect.

4.9.6 However, the vertical railings and blades would create turbulent air around the facade of the building that could potentially disturb the dispersion of the exhaust gases from the plant's stack. For this reason this option has been discounted.

OPTION 4 - PRINTED PVC MESH

4.9.7 Derived from photographs of the vegetation on the East Weare cliff face, the printed PVC mesh would provide an elevational treatment almost indeterminable from the cliff face itself. Whilst just a snap shot of the vegetation at one point of the year the lichen and plant species of the cliff do not change colour much throughout the year and so this would be an effective year round solution.

4.9.8 The PVC mesh is provided with a warranty similar to that of the metal cladding and so both would be replaced at the same time as part of the building's standard operational maintenance regime.



BUILDING ENVELOPE - FACADE DEVELOPMENT

4.10 ROOF

ROOF TREATMENT

4.10.1 The location, scale and orientation of the roof provide the opportunity for a number of different roof treatments. The main options that have been considered are outlined below.

GREEN ROOF

4.10.2 A lightweight 'extensive' green roof, one that predominately consists of sedum, could possibly contribute to the recessive appearance of the building.

4.10.3 A careful selection of sedum species could potentially provide a carpet of colour that would blend with the shrub vegetation behind the building.

4.10.4 Due to the orientation the roof is unlikely to be seen from any areas of the AONB to the east with the roof only visible from the sea and very limited view points on the south eastern cliff face of Portland.

4.10.5 From these viewpoints the roof would be read against the sky or sea respectively, negating the recessed appearance of the sedum.

4.10.6 A green roof could have some ecological benefits by improving biodiversity of the site and potentially helping with the cleansing and filtration of surface water prior to discharging into the sea.

4.10.7 The provision of green roofs could encourage bird nesting in the port which could create operational issues for the proposed building use and those of the wider port where helicopters are occasionally required to land in close proximity to the building.

4.10.8 Given the limited visual benefits of the green roof and the potential operational issues it is considered the cost of a green roof would be better spent on optimising the effectiveness of the building's facade.

FIBRE CEMENT ROOFING

4.10.9 Given the limited positions from which the roof is visible a possible alternative roof treatment might be the use of a dark coloured, sinusoidal, fibre cement roof sheet, similar to that specified on the Upper Osprey Glencore application further up Incline Road.

4.10.10 The dark colour would assist with making the building recessive and the surface of the fibre cement panels is non-reflective ensuring the building would not create any glint or glare as the sun moves throughout the day.

4.10.11 Over the life of the building the panel would weather down, collecting airborne debris in the slightly porous surface of the sheet. Over time this would allow lichen and other moss species to grow in the grooves of the panel, as visible on the old Incline engine house at the top of Incline Road.

PHOTOVOLTAIC PANELS

4.10.12 The main roof of the RDF store is south facing making this orientation ideal for the installation of photovoltaic panels.

4.10.13 If specified with a non-reflective coating the installation of the dark photovoltaic panels could produce up to 764MWh of additional electricity without creating any glint or glare that might compromise the desired recessive appearance of the building.

4.10.14 Whilst in the winter months some overshaddowing of the roof might be created by the 140m cliff face of East Weare the additional electricity would contribute to the sustainability of the ERF and so is explored in more detail on the following pages.

SEDUM GREEN ROOF

FIBRE CEMENT ROOF - ANTHRACITE

OLD INCLINE ENGINE HOUSE, INCLINE ROAD

OLD INCLINE ENGINE HOUSE - SINUSOIDAL ROOF SHEETING WITH MOSS AND LICHEN

FIG 4.23
CONSIDERED ROOFING MATERIALS

BUILDING ENVELOPE - FACADE DEVELOPMENT

4.11 PHOTOVOLTAIC ROOF

PV ROOF

4.11.1 With East Weare escarpment and The Verne sitting at 146m AOD in close proximity to the proposed building there is potential that any PV roof would be overshadowed in the afternoon.

4.11.2 To understand the impact of the overshadowing and assess the resultant efficiencies and viability of a PV roof a detailed solar analysis has been undertaken, as described below.

METHODOLOGY

4.11.3 The roof mounted PV system has been designed using a combination of roof plans and the 3D model of the structure in order to accurately size up the number of panels that could be mounted onto the available roof space, whilst leaving room for the parapet and an access walkway around the system to facilitate operations and maintenance, both of the system itself and the underlying roof structure. This process has demonstrated that the system could be installed with up to 1,559 Longi Solar 450w solar panels, generating a total export capacity of 580kW-AC.

4.11.4 Once the system had been spatially designed the 3D model was imported into an industry standard piece of solar modelling software (PVSyst). The panel layout was integrated with the 3D model and the paired with inverters, a combination of SMA Sunny Tripower 60s and 20000TLs. The combined 3D model and electrical model was then analysed in order to accurately model the effects of the building and terrain shading along with the anticipated losses throughout the system, taking into account the predicated amount of sunlight that will be available.

4.11.5 This analysis has predicted a yield for the site of 764MWh/year.

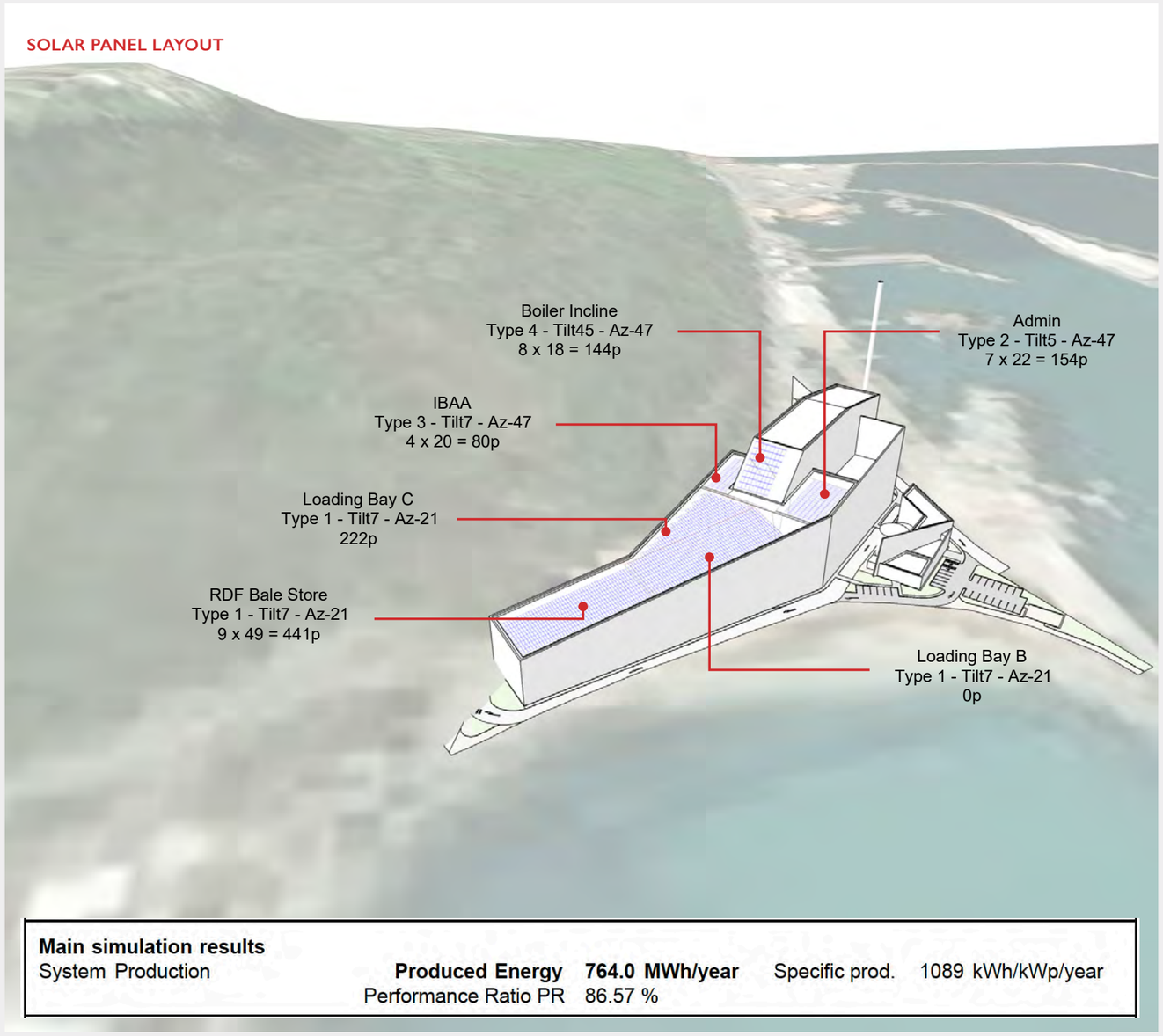
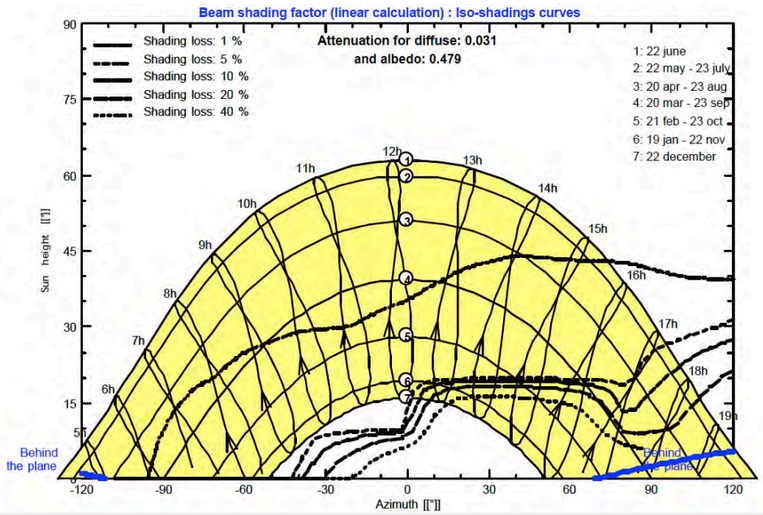


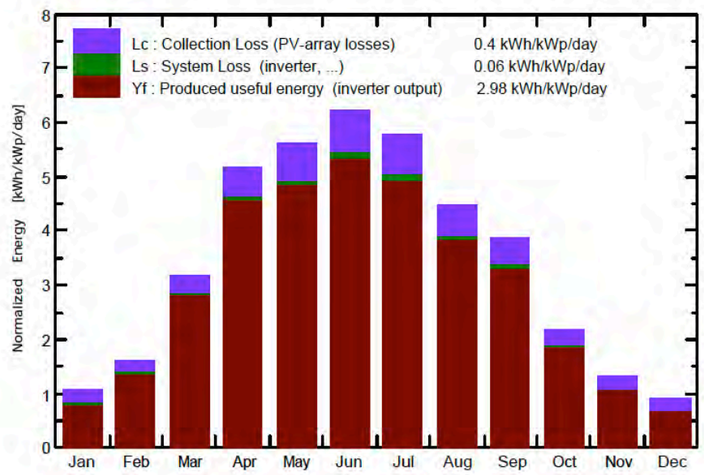
FIG 4.24
PV ROOF - PVSyst SIMULATION RESULTS

ISO SHADING DIAGRAM

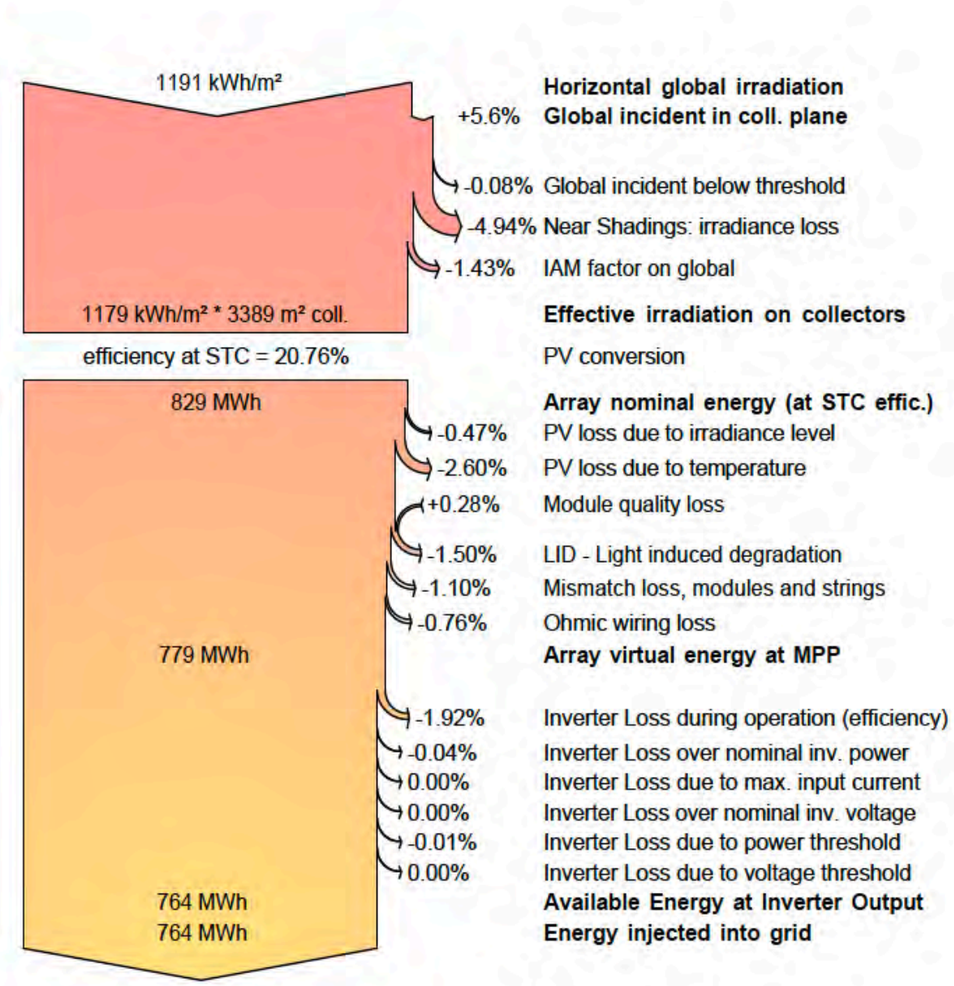


NORMALIZED ENERGY PRODUCTIONS

Normalized productions (per installed kWp): Nominal power 702 kWp



LOSS DIAGRAM OVER THE WHOLE YEAR



BUILDING ENVELOPE - FACADE DEVELOPMENT

4.12 STACK COLOURING

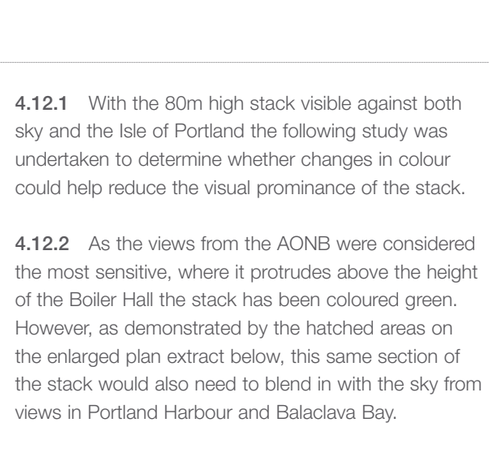
4.12.1 With the 80m high stack visible against both sky and the Isle of Portland the following study was undertaken to determine whether changes in colour could help reduce the visual prominance of the stack.

4.12.2 As the views from the AONB were considered the most sensitive, where it protrudes above the height of the Boiler Hall the stack has been coloured green. However, as demonstrated by the hatched areas on the enlarged plan extract below, this same section of the stack would also need to blend in with the sky from views in Portland Harbour and Balaclava Bay.

4.12.3 Due to the contrast in colour the green stack would stand out more against a clear blue sky than a neutral battleship grey colour from these views.

4.12.4 On an overcast, grey day there is not much difference in the visibility of the coloured or battleship grey stack from the considered angles but the grey blends slightly better into the majority of views.

4.12.5 For this reason it is considered that a neutral battleship grey stack is the least visually prominent solution.



Area where stack needs to be different colours to suit different viewpoints

VIEWPOINT LOCATION PLAN

FIG 4.25
STACK COLOURING CONSIDERED VIEWPOINTS AND BACKDROP

MULTICOLOURED STACK

SUNNY DAY



OVERCAST DAY



BATTLESHIP GREY STACK

SUNNY DAY



OVERCAST DAY



(produced using Google Earth)

VIEW POINT A

VIEW POINT B

VIEW POINT C

FIG 4.26
STACK COLOURING VISUALISATIONS - CONSIDERED VIEWPOINTS FOR VARIED LIGHTING CONDITIONS