Annex 1

Dover Leisure Centre Feasibility Study

For Dover District Council

August 2016

Version Control

Version No	Date	Comments	Author	Reviewed by	Issued to
3	08/08/2016	Draft report for client review	G Thomason/T Pinnington	T Pinnington	Laura Corby

Disclaimer

It is not possible to guarantee the fulfilment of any estimates or forecasts contained within this report, although they have been conscientiously prepared on the basis of our research and information made available to us at the time of the study.

Neither the authors or contributors will be held liable to any party for any direct or indirect losses, financial or otherwise, associated with any contents of this report. We have relied in a number of areas on information provided by the client, and have not undertaken additional independent verification of this information. Where applicable, assumptions have been agreed with the client's representatives and have been clearly stated.

Principal Project Team Members

The principal project team members and their roles are listed below:

Sports Consultant

Project Management Consultant

Architect

Structural Engineer

Quantity Surveyor

M&E Engineer & BREEAM Advisor

Planning Consultant

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The Sports Consultancy · Hadron Consulting · GT3 Architects · engenuiti · Faithful + Gould · BDP. · dha planning

Executive Summary

INTRODUCTION

In April 2016 the consultant team, led by The Sports Consultancy, was appointed by Dover District Council (the Council) to complete a Feasibility Study (to RIBA Stage 2) for a new, Sport England compliant, Leisure Centre proposed to replace the existing Dover Leisure Centre.

The Feasibility Study was commissioned in parallel with development of the Indoor Sports Facility Strategy, which included a recommendation to 'Commission detailed feasibility and site investigation studies required to identify the preferred option for the replacement of Dover Leisure Centre'.

The main purpose of this Feasibility Study is to investigate the preferred options, from the options appraisal study, in greater detail and to ensure that key financial risks are mitigated as far as possible, giving the Council a higher degree of cost certainty as it decides whether, and how best, to proceed.

EXISTING LEISURE CENTRE

The existing dover leisure centre was built in 1975. It is in relatively poor condition and does not provide the range and quality of facilities required to meet the current and future needs of the population of the district.

DEVELOPING A NEW FACILITY

The initial options appraisal study, completed in December 2015, involved completion of an options appraisal study for the improvement and replacement of the existing Dover Leisure Centre, to provide a new leisure centre to serve Dover and, importantly, the wider district. During that study a number of different facility mix options were developed to test their feasibility.

In addition, a number of potential sites within Dover were identified and the different facility mix options were considered on each site, including the existing Leisure centre site in the Town Centre.

FACILITY MIX

Following the review of additional facility options, a facility mix was established as the basis of the preferred option. The table below contains a list of the activity areas proposed in the new centre, compared to those in the existing Dover Leisure Centre. This demonstrates a considerable improvement in the range of facilities as well as the quality of them. The only areas where there will be a decrease in provision is the reduction in sports hall space from 8 badminton courts to 4 badminton courts and the reduction from 3 to 2 squash courts.

Activity Areas	Current Facility Mix	Proposed Leisure Centre Facility Mix	Change Compared to Current
Main pool	6-Lane 25m pool	8 lane x 25m pool	Increase
Spectator seating	140 person capacity	250 person capacity	Increase
Learner pool	12.5m x 7.5m Learner pool	15m x 8.5m with moveable floor	Increase
Sports hall	8 courts	4 courts	Decrease
Health and fitness	37 stations	120 stations	Increase
Multi activity studio	1 x studios	2 x studios	Increase
Multi purpose room (ground floor)	None	1 x room for meetings / parties / soft play / crèche etc	Increase
Spin studio	None	1 x studio	Increase
Squash court	3 x courts	2 x courts	Decrease
Clip Interactive climbing	None	Included	Increase
Small sauna and steam room	Included	Included	No change
2 x five a side football pitches (outdoor 3G)	None	Included	Increase
Café	Included	Included	No change
Parking spaces	95 spaces	250 minimum	Increase

PREFERRED SITE

Following an extensive assessment of potential sites for the new leisure centre and area at White Cliffs Business Park (Whitfield) is considered preferable to other identified alternatives in the urban area.

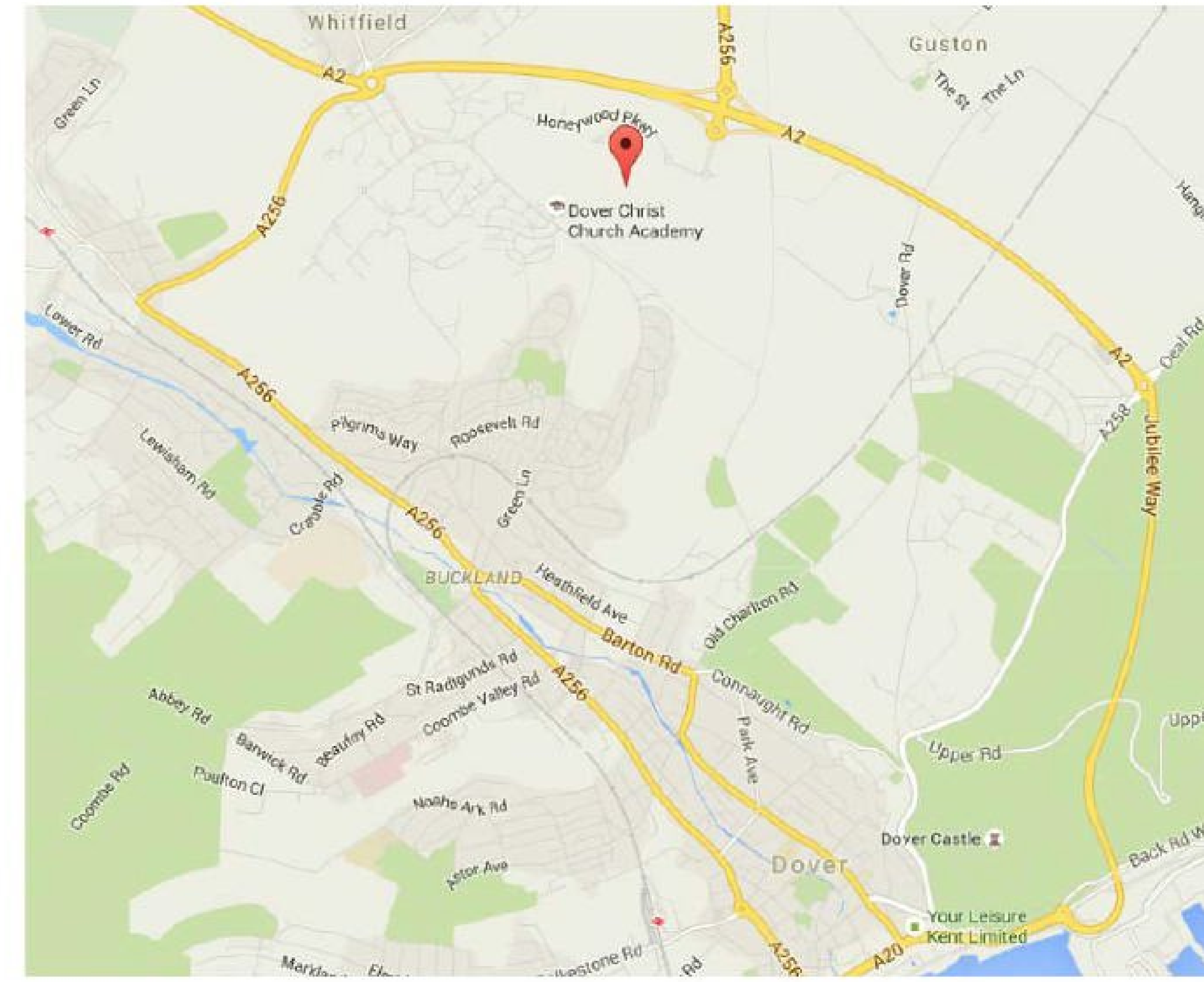
While the conclusions of the sequential test and the wider assessment support the selection of the Whitfield site, it will be for any subsequent planning application to provide the sufficiently detailed planning case for the development, including a thorough assessment of accessibility relative to alternatives and the existing site.

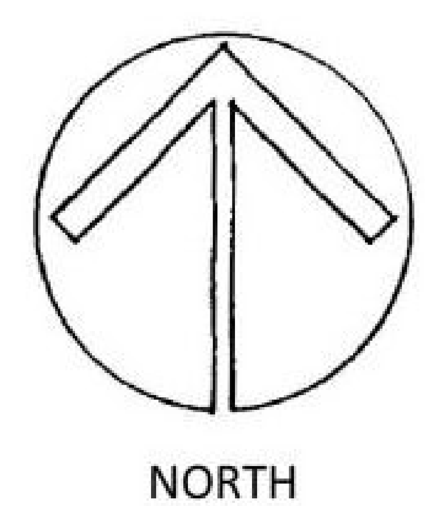
The Council's preferred site for the proposed leisure centre is located as indicated by the redline boundary on the aerial photo opposite. The site is located approximately 1.1km to the south east of Whitfield, 2.7km to the north-north west of Dover and is centred on National Grid Reference 631100, 144230. It is designated as Employment Zone.

Currently the site comprises open farm land, occupying an area of around 5.26acres / 22,688m^2, bound to the North by Honeywood Parkway. The Northern part of the site is bound to the West by commercial developments off Kedleston Road and to the east by a spur road from Honeywood Parkway.

The site lies in a fairly open area with some further commercial development to the North West and a little to the North East and with residential areas to the South and South East. Land to the North of the A2 is largely undeveloped, with the exception of Whitfield to the North West and smaller villages to the North and North East.

Images of the proposed site are provided opposite.



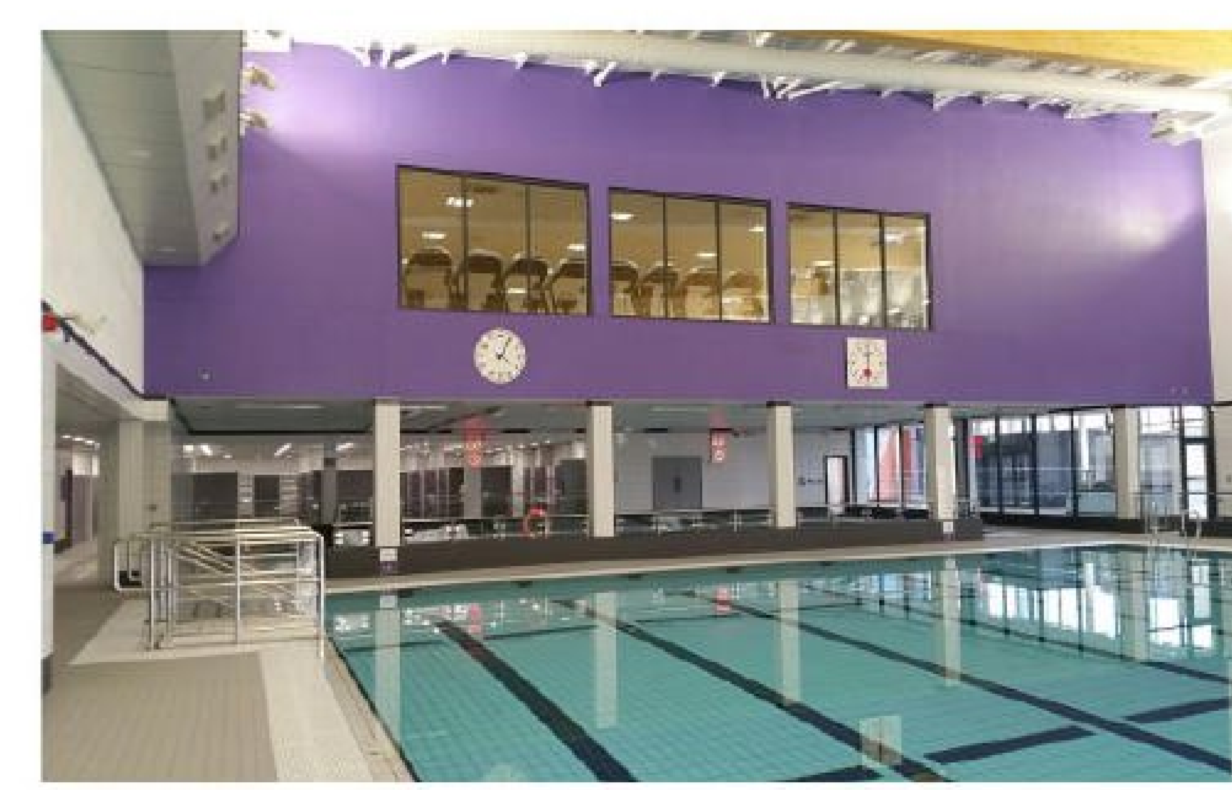


Executive Summary – Proposed Site Plan

The proposed site plan is shown below:

Executive Summary – Proposed Ground Floor Plan

The proposed ground floor plan is shown below:



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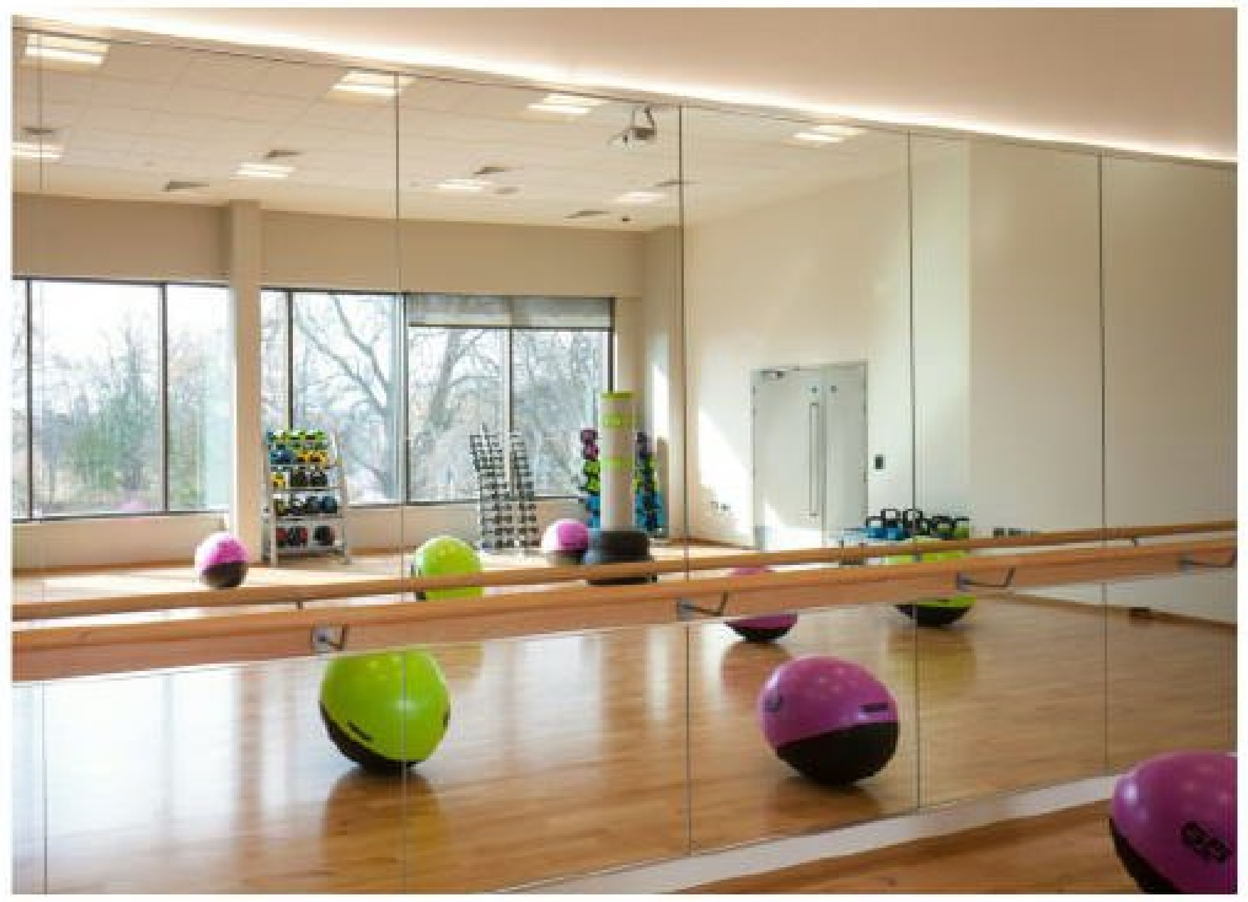
Executive Summary – Proposed First Floor Plan

The proposed first floor plan is shown below:



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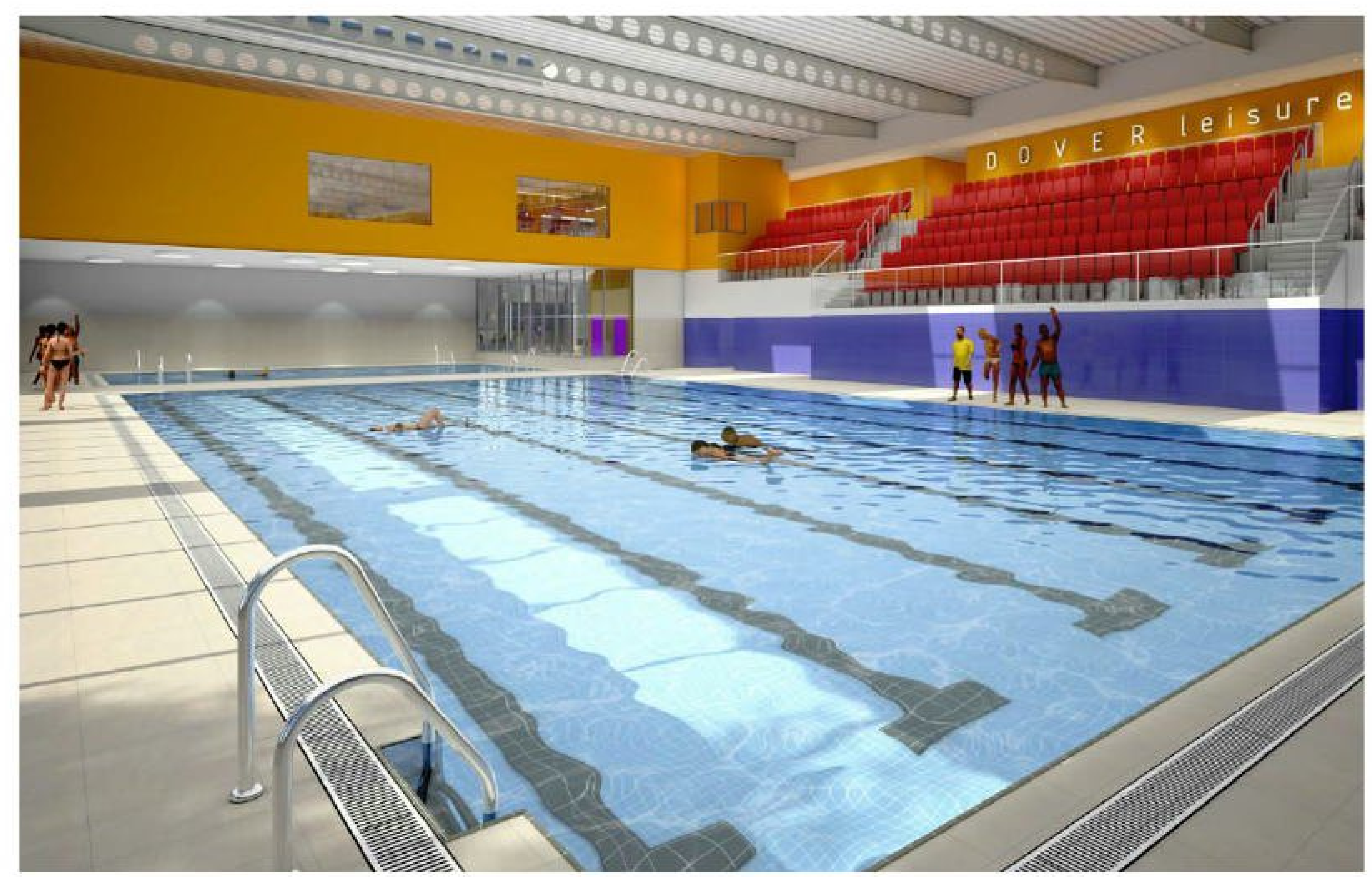
Executive Summary – Indicative Visualisations

A series of indicative visualisations are included below:



Executive Summary – Capital Costs

CAPITAL COST ESTIMATES

Capital cost estimates have been completed by Faithful + Gould. The purpose of this RIBA Stage 2 Cost Plan is to give a magnitude of capital cost to Dover District Council for the proposed new Dover Leisure Centre at the Whitfield site, Dover. The costs are based on the schedule of accommodation and concept design information supplied by the project team.

The current projected capital cost is [redacted]

The approximate cost for the optional addition of green roof to the proposed scheme is [redacted] inclusive of percentage additions for contingency, inflation and professional fees. The Council will investigate other, lower cost options that will achieve similar outcomes, in terms of the BREEAM assessment.

The estimated cost is an outturn cost and therefore inflation is included based on construction commencing in October 2017 with a 15-month construction period.

The overall Gross Internal Floor Area (GIFA) for the new build is 5,548m2 with an overall site area of approximately 22,688m2.

The Design Development / Construction Contingency has been reduced from 15% at feasibility stage to 12.5% in order to reflect the improved level of design information. This provides a contingency sum of circa [redacted]

A summary of the capital cost estimates is provided in the following table.

Description	Stage 2 Cost Plan
Internal Works	[redacted]
External Works	[redacted]
Design Development / Construction Contingency	[redacted]
Building Cost Inflation	[redacted]
Professional Fees including Main Contractor's Design Fees	[redacted]
Sub Total	[redacted]
	[redacted]
Fixtures, Fittings and Equipment (Sports)	[redacted]
Clip n Climb Equipment	[redacted]
	[redacted]
Total Capital Cost	[redacted]
	[redacted]
Additional Options	
Extra over for green roof – say 50% of roof area	[redacted]
Total	[redacted]
Gross Internal Floor Area	**5,548m²**
Build Cost Rate per m²	[redacted]

BUSINESS CASE

A financial business case has been completed, based on the schedule of areas and design contained within this report. The purpose of the business case is:

- To confirm the revenue position of the existing Dover Leisure Centre
- To provide detailed 10-year income and expenditure projections for the operation of the new Dover Leisure Centre
- To define the known and potential capital funding for the project
- To assess the affordability of the project
- To provide conclusions and advise on business case related issues as the project develops.

The opposite table contains a summary of the findings from the business case work. As with most projects of this scale and nature, the proposed funding structure is based on a combination of funding sources. The table shows that the estimated funding gap is between c.£[redacted] (including lifecycle costs) and c.£[redacted] (excluding lifecycle costs).

Lifecycle costs – It is important to consider the treatment of lifecycle costs, for the periodic refurbishment and replacement of facilities. Expenditure on lifecycle costs is important to ensure the facilities are kept in good condition and that income does not diminish over time, due to deteriorating facilities. A typical allowance equal to 1.5% of the build costs (excluding fees and contingencies) should be allowed for, on an annual basis. We have presented the revenue projections including and excluding lifecycle costs.

The revenue projections 'excluding' lifecycle costs provide a like for like comparison with the existing revenue figures for Dover Leisure Centre, as the Council does not currently allow for lifecycle costs in the revenue budget. The revenue projections 'including' lifecycle costs show the impact on expected revenue performance if operators are required to include lifecycle costs in their operational revenue performance

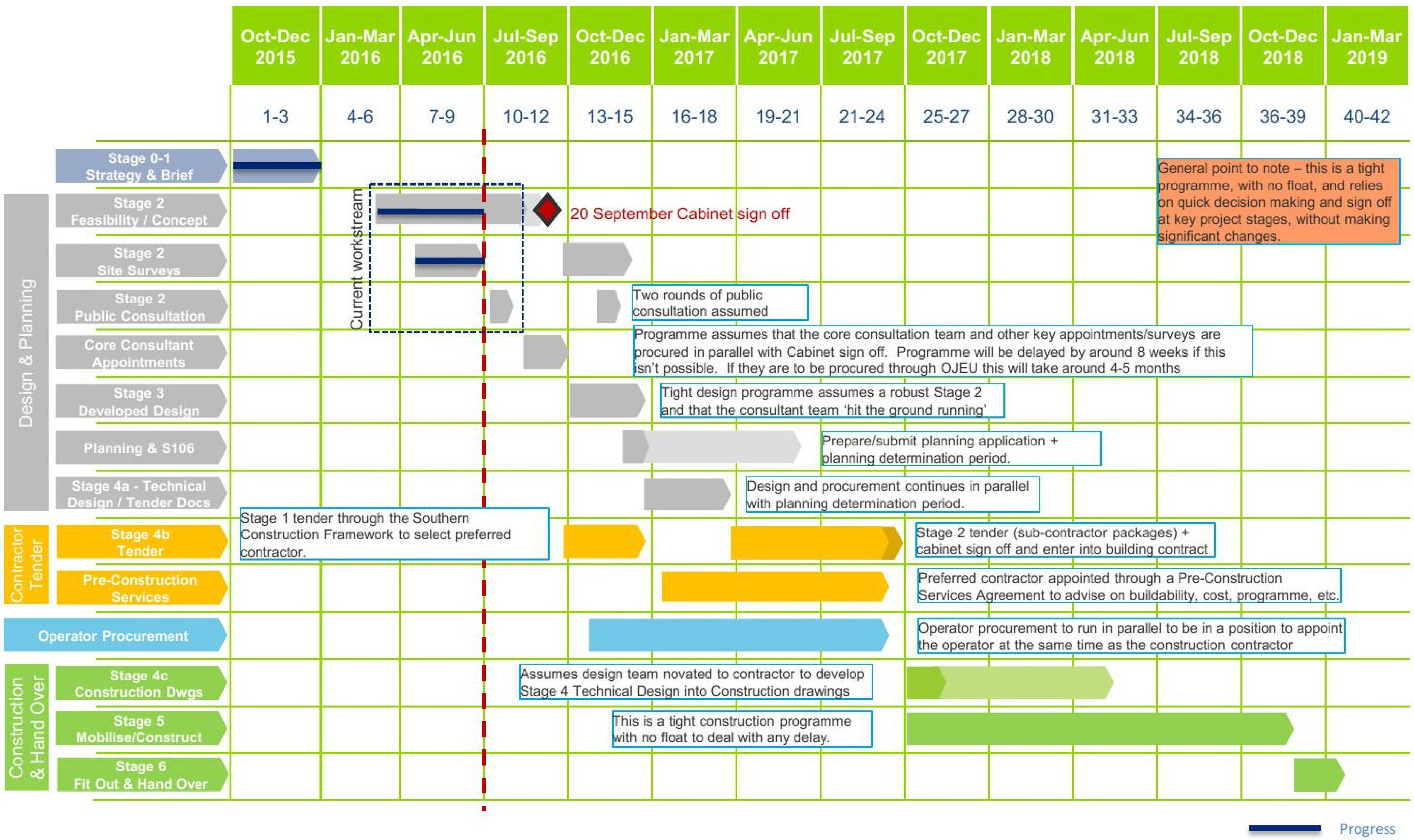
The funding gap will need to be closed if the new centre is to be developed. Options for raising the additional funding should be considered by the Council.

	Including Lifecycle Costs	Excluding Lifecycle Costs
Annual revenue income/(cost) to the Council	[redacted]	[redacted]
Improvement in revenue compared to current centre (2014-15)		
Total capital cost		
Sport England funding		
Prudential borrowing potential*		
Funding Deficit/Surplus		
Potential Revenue Deficit/Surplus after funding repayments		

*The principal source of funding is prudential borrowing. The amount of prudential borrowing available is based on an assumption of a 40 year loan @ 3.75%, on an annuity basis, costing £50k per £1m borrowed per year.

PROJECT PROGRAMME

We have prepared a detailed target programme, which shows that the centre could be open by early 2019. A high-level summary of the target programme is also shown below. This is a tight programme, with no float, and relies on quick decision making and sign off at key project stages, without making significant changes. This should therefore be seen as a target programme and the Council should allow some programme contingency when reporting dates publicly.



KEY RISKS

An initial Risk Register has been prepared. An extract from the risk register showing the highest project risks is included on opposite. This identifies risks and states the probability of occurrence and the likely extent of impact on cost or programme.

The initial register has been prepared based on our understanding of the critical objectives for the project. The ratings have also been informed by survey work carried out during the feasibility stage and the way the design has been developed. Where further surveys should be undertaken to establish or mitigate risk this is also identified.

The risk register should be used in future phases to identify risks to enable the risk to be managed by the risk owner, mitigated and transferred to the contractor wherever possible. Due to the nature of some risks and the cost premium to transfer the risk to the contractor, some risks will need to be retained and managed by the Council.

The risk register should be updated regularly as the design development progresses, during tender stage and post-contract during the construction phase.

		Assessment of Risk		
Risk Area	Risk Description	Impact (1 - 5)	Likelihood (1 - 5)	Score
Site Ownership	Delay / unable to purchase the site.	5	5	25
Utilities	Insufficient water supply capacity to serve the proposed development. Increased cost and programme delay. Payment required for offsite works.	5	5	25
Cost	Land purchase is more than anticipated and/or makes the project unaffordable.	5	4	20
Finance/Funding	Sport England funding not obtained.	5	4	20
Planning	Planning application is rejected or consent is delayed. (See also other planning risks, which could have an imact on this, and the proposed mitigation measures)	5	4	20
Planning	S106 Agreement/Developer Contribution required for offsite highway improvements or contribution to Bus Rapid Transit	4	5	20
Programme	Construction programme is insufficient.	4	5	20
Site	Poor ground conditions.	5	4	20
Utilities	Insufficient electrical supply and/or nothing local to the site.	5	4	20

OVERALL PROCUREMENT RECOMMENDATIONS

To summarise, we consider the approach outlined in the opposite table be the most appropriate procurement approach.

CONTRACTOR SOFT MARKET TESTING

Soft market testing was completed with the contractors on the Southern Contractors framework to establish the level of interest in the project.

[redacted]

[redacted] The results support the recommendation to use the Southern Construction Framework.

OPERATOR PROCUREMENT RECOMMENDATION

It was agreed that the leisure management contract and construction contract should be procured separately. It was also agreed that the procurement of the leisure management contract should be progressed in parallel with the construction contract so that the commercial position for the operator is known before entering into the construction contract.

OPERATOR SOFT MARKET TESTING

Nine operators where engaged with during the soft market testing exercise, to seek their views on the proposed plans for the new Dover Leisure Centre and to gauge interest in outsourcing of its management alongside that of Tides Leisure Centre in Deal.

Overall, operators are supportive of the proposals and there is clearly significant interest in the management contract opportunity encompassing Tides and Dover Leisure Centre. This should help ensure a competitive tendering process to maximise the financial offer from potential operators.

Approach
Contractor and operators to be procured separately. This will discount a DBOM, DBFO and Asset Transfer approach.
A two stage develop and construct procurement route to be adopted.
Design developed to Stage 4 (previously Stage E) in conjunction with the contractor and for the completion of the second stage tender.
A fixed lump sum price is obtained for the works.
Key designers, e.g. architect and civil/structural engineer would be appointed by/novated to the contractor to complete the design.
The contractor is procured through the Southern Construction Framework.
Procurement of the leisure management contract should be progressed in parallel with the construction contract so that the commercial position for the operator is known before entering into the construction contract.

CONSULTATION PROCESS

Following completion of the draft report the Council undertook a wide ranging consultation exercise. The purpose of this was to share the findings of the work to date and to invite comments from a broad range of stakeholder groups and the community of the District. The aim was to maximise engagement and to encourage groups and individuals to respond to the consultation questionnaire.

The following groups were included in the consultation process:

- Leisure centre users (existing and potential)
- Your Leisure and potential new operators
- Sport England
- National Governing Bodies of Sport (e.g. ASA)
- Local sports clubs and community groups
- General public
- Elected members
- Project Advisory Group
- Kent County Council
- Kent Community Health NHS Foundation Trust
- South Kent Coast Clinical Commissioning Group
- Kent Sport and sports networks
- Local primary and secondary schools
- Dover District Disability Association
- Town and Parish Councils
- Your Leisure database of existing customers
- protected characteristic groups
- local civic groups
- Local media.

The following communications channels were used for the consultation process:

- Website content
- Social media (#NewDoverLeisureCentre)
- 'A to Z' Leisure Facilities
- Keep Me Posted
- Media Relations
- Public consultation events
- Survey monkey questionnaires
- FAQs
- local adverts in papers
- posters at area offices
- leisure centres and libraries
- direct contact with Key stakeholders
- consultation displays at Dover & Tides Leisure centre.

RESULTS OF CONSULTATION

The level of response to the consultation process was relatively high, at 673. The results generally demonstrate there is a good level of support for the proposals. There are some notable comments relating to the facility mix, location and accessibility, which should be considered further as the project develops.

Overall, the results of the consultation to date have been positive and will feed into the next stage of work, as designs are refined.

Introduction & Background

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This Feasibility Study was commissioned in parallel with conclusion of the Indoor Sports Facility Strategy, which included a recommendation to 'Commission detailed feasibility and site investigation studies required to identify the preferred option for the replacement of Dover Leisure Centre'.

In parallel with completion of the Indoor Sports Facility Strategy, an initial options appraisal study was completed in December 2015. This involved completions of an options appraisal study for the improvement and replacement of the existing Dover Leisure Centre. The outputs from the study were used by the Council as the basis of decisions on whether, and how best, to proceed with the development of a new leisure centre to serve Dover and the wider district.

The main purpose of this Feasibility Study is to investigate the preferred options, from the options appraisal study, in greater detail and to ensure that key financial risks are mitigated as far as possible, giving the Council a higher degree of cost certainty as it decides whether, and how best, to proceed. The key stages of work that have been completed are listed below:

- Stage 1 - Project Initiation
- Stage 2 – Sequential Test and Planning Consultancy
- Stage 3 - Background Review & Surveys for the Whitfield site
- Stage 4 - Stakeholder Consultation and Brief Development
- Stage 5 - Development of the Facility Options
- Stage 6 - Management Options and Soft Market Testing
- Stage 7 - Public Consultation
- Stage 8 - Refinement of Options
- Stage 9 - Recommendations & Conclusions
- Stage 10 - Meetings and Presentation.

A number of surveys and investigations were commissioned to inform the work completed by the project team during the Stage 2 Feasibility Study. These are listed in the following table.

Consultant Surveys/Investigations
Sequential test report
Planning strategy review
Pre-application highways advice from KCC
Infiltration report from British Geological Survey
Sewer records from Southern Water
Surface water capacity check
Foul water capacity check
Topographic survey
Below ground services trace
Statutory services record
Desktop Site Investigation
BREAAM Stage 1 Assessment
Council Surveys/Investigations
Photographic work preliminary to preparing an LVIA
Preliminary ecological appraisal
Reptile survey

The remainder of this report contains a summary of the findings and recommendations from the study.

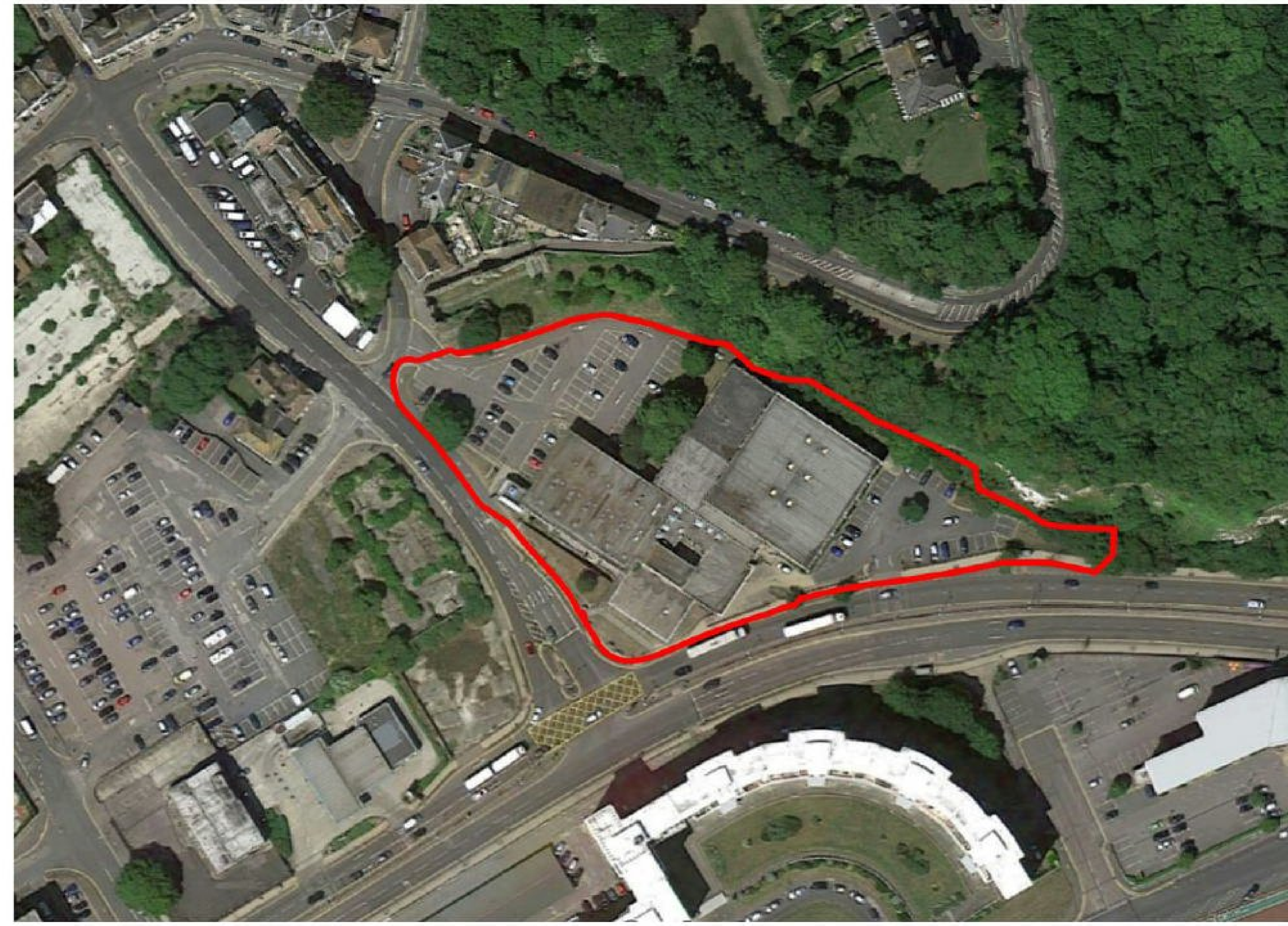
Introduction & Background

Existing Leisure Centre

The existing dover leisure centre was built in 1975. It is in relatively poor condition and does not provide the range and quality of facilities required to meet the current and future needs of the population of the district. It contains the facilities listed below:

Activity Areas	Current
Main pool	6-Lane 25m pool
Spectator seating	140 person capacity
Learner pool	12.5m x 7.5m Learner pool
Sports hall	8 courts
Health and fitness	37 stations
Multi activity studio	1 x studios
Squash court	3 x courts
Small sauna and steam room	Included
Café	Included
Parking spaces	95 spaces

A site image and photographs of the existing centre are shown opposite.



Indoor Sports Facility Strategy for Dover District

The Council recently completed an Indoor Sports Facility Strategy. Following Sport England's recommended methodology. This study included a detailed needs analysis to identify current and future (up to 2026) provision required to meet the indoor sport facility needs of Dover residents.

It provides a robust evidence base for decisions taken on the scale of facilities required in each of the facility options considered for the replacement of Dover Leisure Centre. In line with the brief, we reviewed the supply and demand issues affecting the following facility types:

- Indoor swimming pools
- Sports halls or flexible indoor space with 1 court or more
- Fitness suites
- Indoor bowls
- Dance/aerobic studios
- Indoor tennis courts
- Squash courts
- Gymnastics centres

A high level summary of the findings from the district wide needs analysis, taken from the Indoor Sports Facilities Needs Assessment report, is contained in the opposite table. This contains the recommendations by facility type for the whole district.

Facility Type	Recommendations for Dover Leisure Centre
Main pool	• 6 or 8 lane 25m pool should be considered (100 spectator seats in 6 lane option and 250 in 8 lane option). • 6 lanes would replace the existing provision. 8 Lanes would increase provision and would reduce the current, district wide shortfall in provision from 6 to 4, 25m lanes.
Learner pool	• A learner pool should be provided with a moveable floor to focus on swimming lessons. A learner pool should be provided with a moveable floor to focus on swimming lessons. This space will also be used for other activities including aqua aerobics, which contribute to wider health and wellbeing objectives.
Sports hall	• 4 – 8 courts should be considered. • According to Sport England's FPM analysis, a reduction in the amount of sports hall space, from the current 8 courts to 4, a new replacement Dover Leisure Centre does not appear to have a detrimental impact on satisfied demand in Dover. However, this assumes that community access to sports hall space at Dover College, Sir Roger Manwood's School, Duke Of York's Royal Military School and Dover Christ Church Academy is realised. This also assumes continued community access to sports hall space at Castle Community College.
Health and fitness	• The latent demand analysis indicates that 120 stations could be supported.
Multi activity studio	• It is recommended that 2 - 3 x studios should be provided in a facility of this scale.
Spin studio	• A dedicated spin studio should be provided in larger facility options.
Squash court	• A maximum of 3 courts should be considered, in the larger facility options, to retain existing levels of provision • The Council could decide not to provide any in smaller options however, England Squash suggest that the courts at Dover Leisure Centre are very important for the area.
Gymnastics	• There is latent demand identified (through waiting lists) at Dover Gym Club and Deal Gym Club. However, it should be noted that these facilities are often developed as commercially viable businesses.
Parking spaces	• Indicative parking requirements should be calculated based on the scale of each facility option and based on Kent County Council parking standards.

Recommendations of the Initial Feasibility and Options Appraisal Study for Dover Leisure Centre

The initial feasibility and options appraisal study was completed in January 2016. It involved consideration of a number of options that address the priorities identified Indoor Sports Facility Strategy and the district wide strategy and action plan, contained therein. The key conclusions of the study are summarised below:

- While significant refurbishment of the centre could provide improvement in the quality of provision, there are a number of key risks and disadvantages associated with refurbishment, compared to the new build options. On balance, it is recommended that a new build centre will provide a better long-term solution for the needs of Dover and the wider district and as a consequence offers better value for money to the Council than refurbishment.
- Of the new build options considered, Option 2 is the most affordable option to balance the identified needs for the district and affordability. However, it does represent a reduction in sports hall space from the current 8 courts to 4 courts. This option would also see the loss of squash from the centre. This would have a negative impact on squash and current users may find it difficult to secure bookings at alterative sites during peak times.
- Work completed during the indoor leisure needs assessment and strategy, including results from Sport England's Facility Planning Model, indicates that recent and planned developments, by other providers in the area, has and will (if delivered) increase the supply of accessible 4 court sports halls at peak times. This will relieve some of the requirement for the Council to provide the existing level of indoor sports hall space, supporting the potential reduction in provision.
- Option 4 provides the best option in terms of meeting the identified needs for the wider district, although it is less affordable than Option 2.
- Option 1 is the most affordable option but will result in a greater shortfall in sports hall provision in Dover and the wider district. While more affordable, this removal of sports hall provision is not recommended.
- Options 3 and 5 are larger in scale and arguably represent over provision. The affordability gap is greater the larger the facility option. These options are far less affordable and are not aligned to the findings from the needs analysis. They are not recommended for these reason (see opposite table).
- Overall, Option 2 is the most affordable while Option 4 provides the best option in terms of meeting identified needs. Both options should be taken forward to the next stage of project development (RIBA Stage 2 Feasibility).

Site Options Appraisal

During the initial feasibility and options appraisal study, the selection of the most appropriate site for a new leisure centre was a key consideration. Five potential sites were identified by the Council for consideration. The sites are listed below and their locations shown on the following page:

- Buckland Mill
- Dover Leisure Centre
- Maison Dieu
- Waterfront
- Whitfield.

The site appraisal work concluded that, only Buckland Mill and Whitfield have the capacity to fully accommodate the facility options identified. Both are subject to a range of advantages and disadvantages and factors which could influence the final decision by the Council. It was recommended that Selection of either site would necessitate the completion of a full sequential test, as part of a planning application. This could identify further alternative sites to be considered.

REFURBISHMENT VERSUS NEW BUILD

As noted previously, during the Initial Feasibility and Options Appraisal Study refurbishment and reconstruction of the existing Dover Leisure Centre was considered. We assumed that refurbishment and reconstruction would involve retaining some or all of the existing structure and undertaking significant works. No specific plans were developed for refurbishment at that stage but it was assumed that refurbishment would include significant layout changes to the building structure and full replacement of plant and mechanical and electrical installations and external finishes. The intention is to provide a refurbished building, containing a similar facility mix to the current offer but this would not address identified long term needs of Dover & the wider District. Refurbishment would extend the life span of the existing building by another 20 years or so. The estimated cost was circa £13m - £15m. Refurbishment was discounted for the following reasons:

- Refurbishment of the existing building is the cheapest option, if the existing facility mix is to be retained. However, current and future needs, identified in the recently completed Indoor Sports Facility Strategy, cannot be met by this option so there will be little improvement in the facilities provided for the community of Dover and the wider district.
- The centre would be closed for between 12 and 18 months while the works are carried out, with very limited alternative provision for users in the district, particularly swimmers.
- The existing building is over 40 years old. Full refurbishment is likely to extend the lifespan of the building by another 20 years or more, whereas a good quality new build will be designed to provide a facility that will last for 35 - 40 years, providing a longer term solution.
- The layout of the existing building is inefficient with a large areas used for circulation. While this can be improved to some extent through remodelling, underutilised spaces may remain in places. A new build would be based on a far more efficient layout, minimising the capital and revenue costs. Refurbishing the existing building is likely to result in compromises that would not occur in a new build.
- Refurbishment and remodelling carries significant risks in terms of, for instance, structural, plant, mechanical and electrical issues and asbestos contamination. These risks can be mitigated to some extent by completing invasive surveys and investigations during feasibility work but risks remain which can have significant cost implications.
- There is likely to be less interest from building contractors for a major refurbishment project compared to a new build. The main reason for this is that the level of risk associated with refurbishment projects is far higher than for a new build. In the current, buoyant construction market many contractors are less willing to tender for this type of work. Where they do tender, they are likely to price additional risk/contingency within their tender.

- The capacity of the existing leisure centre site to accommodate the facilities, and parking required to support future growth in use, is restricted. Alternative sites could provide a greater level of on site parking, making them more accessible to visitors travelling by car.
- The site options appraisal and sequential test demonstrated that the existing location is not the preferred location for a facility with district wide appeal.

Facility Mix

Facility Mix

STARTING POINT

The conclusions of the Indoor Sports Facilities Strategy and the Initial Feasibility and Options Appraisal Study for Dover Leisure Centre resulted in the identification of a preferred facility option (Option 4), to form the basis of the Stage 2 Feasibility Study.

The proposed facility mix was reviewed at the outset of the Stage 2 Feasibility Study to provide a core facility mix. This is contained in the following table.

Activity Areas	Proposed Leisure Centre Facility Mix (Option 4)
Main pool	8 lane x 25m pool
Spectator seating	250 person capacity
Learner pool	15m x 8.5m with moveable floor
Sports hall	4 courts
Health and fitness	120 stations
Multi activity studio	2 x studios
Multi purpose room (ground floor)	1 x room for meetings / parties / soft play / crèche etc.
Spin studio	1 x studio
Squash court	3 x courts
Interactive climbing	Included
Small sauna and steam room	Included
2 x five a side football pitches (outdoor 3G)	Included
Café	Included
Parking spaces	250 minimum

SITE VISITS

To inform the development of the facility design and layout, members of the project team visited a number of recently developed leisure centres containing comparable facilities.

The purpose of the visits was to view comparable facilities and to learn lessons from them to inform decisions on facility mix and specification. The facilities visited included:

- Westminster Lodge Leisure Centre – St Albans
- Flitwick Leisure Centre - Central Bedfordshire
- Watford Central Leisure Centre – Watford
- Ramsgate Leisure Centre – Ramsgate
- Elmbridge Leisure – Walton-on-Thames
- Clip n Climb – Chelsea.

A selection of photographs from the sites visited are shown opposite.












REVIEW OF FACILITY MIX

During the early stage of the Stage 2 Feasibility Study further facility options, were identified and tested before finalising the facility mix for the new centre. The following facilities were identified by the Council's project team, Project Advisory Group and following initial stakeholder and public consultation:

- Full size 3G pitch
- Soft play (not staffed)
- Clip and climb / interactive climbing
- Toning tables
- 50m pool with 500 spectator seats
- Additional 4 Court Sports Hall
- 2 x five a side football pitches (outdoor 3G)
- Confidence water area
- Full Spa (e.g. Ramsgate model).

The review of the impact of these additional facilities included the following work:

- Estimating the additional capital cost of each option.
- Estimating the net revenue implications.
- Calculating the impact on affordability / funding based on the increase in capital costs versus the increase or decrease in revenue performance.

The table opposite contains a summary of the results of the analysis. The additional facilities are listed in descending order, in relation to their impact on affordability. The results of the analysis were discussed with the Council's project team and it was agreed that the following facilities should be added to the Core facility mix to increase the range of activities and to improve the financial viability of the centre:

- Clip and climb / interactive climbing
- 2 x five a side football pitches (outdoor 3G).

The majority of the remaining facilities are likely to have a negative impact on the affordability of the project, as the additional net revenue generated is not sufficient to fund the prudential borrowing repayments required to access the capital required to finance the additional build costs.

The table opposite contains a summary of the results of the affordability analysis. The additional facilities are listed in descending order, in relation to their impact on affordability. The rows shaded green indicate facilities that are recommended for inclusion in the facility mix, due to their positive impact on affordability. Rows shaded in amber are facilities that will potentially have a negative impact on affordability. Their inclusion in the facility mix should be carefully considered. Rows shaded red contain facilities that will have a significantly negative impact on affordability. Their inclusion in the facility mix would increase the affordability gap significantly and will have a negative impact on the financial viability of the project.

Description	Affordability Comparison with Core Option	Recommendation and Rationale
2 x five a side football pitches (outdoor 3G)	£421,165	Include, as this has the most significant positive impact on affordability. Provision of outdoor five a side pitches can mitigate the impact of the loss of 4 courts compared to the existing centre, so important from a participation perspective.
Clip and climb / interactive climbing	£268,716	Inclusion should improve financial viability significantly. It should be regarded as a 'nice to have' facility. There is a risk associated with providing such a specific activity area, if trends change in the future, so the area should be designed to be able to accommodate other activities in future, if required.
Full size 3G pitch	£117,666	The Council could provide this to meet a clear strategic need, though other organisations in Dover are considering provision of similar facilities. Suggest the Council works towards provision in partnership with another organisation e.g. Dover Christchurch Academy, possibly in partnership with football and rugby clubs. Initial consultation has suggested these clubs are interested in a partnership.
Small sauna and steam (poolside)	£38,890	Should include based on the improved affordability. Not a strategically important facility, so it perhaps should be regarded as a 'nice to have' facility. It is noted that the current centre includes these facilities. If they are not included this would represent a reduction in provision.
Toning tables	-£385,786	Do not include on grounds of affordability. Should only be included if there is a specific and clearly identified need from a health and inclusion perspective. Also, there is the possibility of adding similar facilities at Tides and they are unlikely to be sustainable if added at both sites.
Full Spa (e.g. Ramsgate model)	-£472,259	Do not include on grounds of affordability. This option presents a risk, in terms of financial viability, and should be regarded as a nice to have facility. Could be considered as a potential future phase / extension. Operator consultation has identified this is an option that would require further detailed viability assessment before a decision is made on inclusion.
Soft play (not staffed)	-£762,083	Do not include on grounds of negative impact on affordability. It was also noted that similar facility, previously operating in the Whitfield area, has closed. While the reasons for this are not known it suggests that this was not a sustainable location.
Confidence water area	-£1,214,501	Do not include on grounds of affordability and competition with the leisure water provision at Tides (Deal), which meets this need for the district better. Tides should remain the focus of family leisure swimming.
Additional 4 Court Sports Hall	-£2,193,210	Do not include. Likely to have a negative impact on affordability of the project, increasing the affordability gap significantly. Provision of outdoor five a side pitches can mitigate the impact of the loss of 4 courts compared to the existing centre, as much of the activity that takes place in the hall at peak time is five a side football.
50m pool with 500 spectator seats	-£7,660,487	This option creates the largest affordability gap of all options. Do not include on grounds of affordability and no strategic need identified. It would result in over provision in terms of pool water and is aimed more at elite/competition swimmers. Dover is not currently identified as a priority for a 50m competition pool by the Amateur Swimming Association.

AGREED FACILITY MIX

Following the review of additional facility options, a facility mix was established as the basis of the preferred option. The opposite table contains a list of the activity areas proposed in the new centre, compared to those in the existing Dover Leisure Centre. This demonstrates a considerable improvement in the range of facilities as well as the quality of them. The only areas where there will be a decrease in provision is the reduction in sports hall space from 8 badminton courts to 4 badminton courts and the reduction from 3 to 2 squash courts. The rationale for these changes is provided below:

Sports Hall

The recently completed Indoor Sports Facility Strategy concluded that the potential reduction (from 8 courts to 4 courts) in the amount of sports hall space provided at a new replacement Dover Leisure Centre does not appear to have a detrimental impact on satisfied demand in the District. However this assumes that community access to sports hall space at Dover College, Sir Roger Manwood's School and Duke of York's Royal Military School is realised and that there is community access to sports hall space at Castle Community College. Operator consultation, and analysis of typical programmes of use, showed that the programme of use is dominated by a significant amount of five-s-side football use. It was concluded that this could be provided for in a more financially viable way through provision of 2 x five a side football pitches (outdoor 3G) at a new centre, thereby reducing demand for indoor sports hall space.

Squash Courts

The reduction from 3 to 2 squash courts in the new centre is based on a requirement to provide the most financially viable range of facilities. Consultation with the existing operator and soft market testing with potential operators generally supported the proposed level of provision, with one operator questioning the need for any squash provision. The recently completed Indoor Sports Facility Strategy highlighted that access to courts at Duke Of York's Military School should be explored and could mitigate the loss at Dover Leisure Centre, particularly for clubs, if the reduction in provision a Dover Leisure Centre causes and issue for users.

Activity Areas	Current Facility Mix	Proposed Leisure Centre Facility Mix	Change Compared to Current
Main pool	6-Lane 25m pool	8 lane x 25m pool	Increase
Spectator seating	140 person capacity	250 person capacity	Increase
Learner pool	12.5m x 7.5m Learner pool	15m x 8.5m with moveable floor	Increase
Sports hall	8 courts	4 courts	Decrease
Health and fitness	37 stations	120 stations	Increase
Multi activity studio	1 x studios	2 x studios	Increase
Multi purpose room (ground floor)	None	1 x room for meetings / parties / soft play / crèche etc	Increase
Spin studio	None	1 x studio	Increase
Squash court	3 x courts	2 x courts	Decrease
Clip Interactive climbing	None	Included	Increase
Small sauna and steam room	Included	Included	No change
2 x five a side football pitches (outdoor 3G)	None	Included	Increase
Café	Included	Included	No change
Parking spaces	95 spaces	250 minimum	Increase

Site Appraisal

SEQUENTIAL TEST ASSESSMENT SUMMARY

Having agreed the facility mix for the new centre at Whitfield, the issue of site identification was examined. While a site at Whitfield was identified as the preferred site during the initial Options Appraisal Study, this needed to be tested further to ensure it is the preferred option.

Dover District Council is pursuing plans for a replacement to Dover Leisure centre, which comprises a 'Main Town Centre Use' as defined within the National Planning Policy Framework (NPPF). Accordingly, and as directed by policy, a Sequential Test Assessment is required in the event that an out of centre site is proposed. DHA Planning was commissioned to complete the sequential test assessment, in close consultation with planning officers from the Council.

The assessment fulfils that requirement and follows the available and applicable guidance, given that the Council identified an out of centre site at White Cliffs Business Park, Whitfield as the likely preferred site during the initial options appraisal study.

The sequential test report offers an independent assessment of potential alternative sites having regard to suitability and availability for the proposed development, the minimum requirements of which have been informed by thorough feasibility work carried out in 2015 and 2016.

The assessment has drawn upon a range of evidence and methods to identify and assess potential sites. It is intended to inform the Council's ongoing review and decision-making process in the delivery of a new leisure centre and should be subject to ongoing review as and when any new evidence becomes available (such as the results of the recent Brownfield Call for Sites) or new sites identified or suggested. This ongoing review should continue up to the point of planning application submission, if pursued, to ensure a robust document is presented as part of any application that both informs the proposals and informs the local planning authority's determination of the application.

CONCLUSIONS OF THE SEQUENTIAL TEST ASSESSMENT

No site, located within the town centre, has been identified that can reasonably be considered available, suitable and viable for the proposed leisure centre development, even when allowing for some disaggregation of facility in the form of the proposed artificial turf 5-a-side football pitches.

No site located in an edge of centre location, as defined by policy (within 300m of the defined town centre), has been identified to date that can reasonably be considered available, suitable and viable for the proposed leisure centre development, even when allowing for some disaggregation of facility in the form of the proposed artificial turf 5-a-side football pitches.

Accordingly, it is considered that the proposals for the site at Whitfield satisfy the sequential test, as set out within and required by the NPPF.

Wider Assessment

Separate from the sequential test, other potential sites in the wider urban area have been considered in the interests of informing the overall planning balance and consideration, particularly in light of the Land Allocations Local Plan stating that 'given that the existing building is near the end of its useful life, an opportunity exists to create a landmark building. Leisure facilities could be located at a different site, so long as it equally accessible to residents'.

Other sites, suitable in size, have been identified at Buckland Mill and Coombe Valley Road, however these are all allocated for housing. In contrast, the currently favoured site by the Council, as facility provider, is allocated for employment, which although not strictly consistent with a leisure use, does still offer employment opportunities. Buckland Mill is confirmed by the site owners as unavailable.

In locational terms, the potentially available and suitable sites (Coombe Valley Road and Whitfield) are not currently highly accessible by public transport, although the Local Plan does make direct future provision for improved bus services at Whitfield and it provides a more strategically advantageous and prominent location.

Therefore, in the wider planning sense, owing to the nature of its allocation (relative to Coombe Valle Road) and the greater scope for public transport access, land at White Cliffs Business Park (Whitfield) is considered broadly preferable to other identified alternatives in the urban area.

Preferred Site

The principle advantages of developing a leisure centre on the Whitfield site are listed below:

- It can be developed while maintaining full continuity of service at the existing leisure centre.
- This is a large site which has adequate capacity to accommodate new leisure centre and parking.
- The site is serviced by an existing road and more space is available for parking at this site than the town centre and edge of centre locations.
- There is an aspiration to introduce a Bus Rapid Transit service that will provide good public transport links with the town centre and Whitfield; if the leisure centre were relocated to Whitfield the project could contribute towards the cost of creating the BRT.
- This greenfield site offers fewer design constraints than an urban location, e.g. it is not adjacent to a conservation area
- It is located on the edge of the Dover urban area with good access to the trunk road network and would be readily accessible by car from the wider district.
- As a greenfield site, buildability and deliverability is likely to be more straightforward than brownfield site. This should help minimise the build programme and consequently the impact of building cost inflation.
- It has the ability to develop into a wider sports hub, with potential pitches, external leisure facilities, etc.
- Use of this site, which is designated as employment land would involve investment within the Council's premier business park.

While the conclusions of the sequential test and the wider assessment support the selection of the Whitfield site, it will be for any subsequent planning application to provide the sufficiently detailed planning case for the development, including a thorough assessment of accessibility relative to alternatives and the existing site.

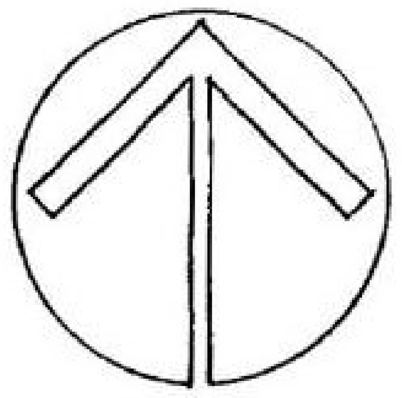
Site Appraisal

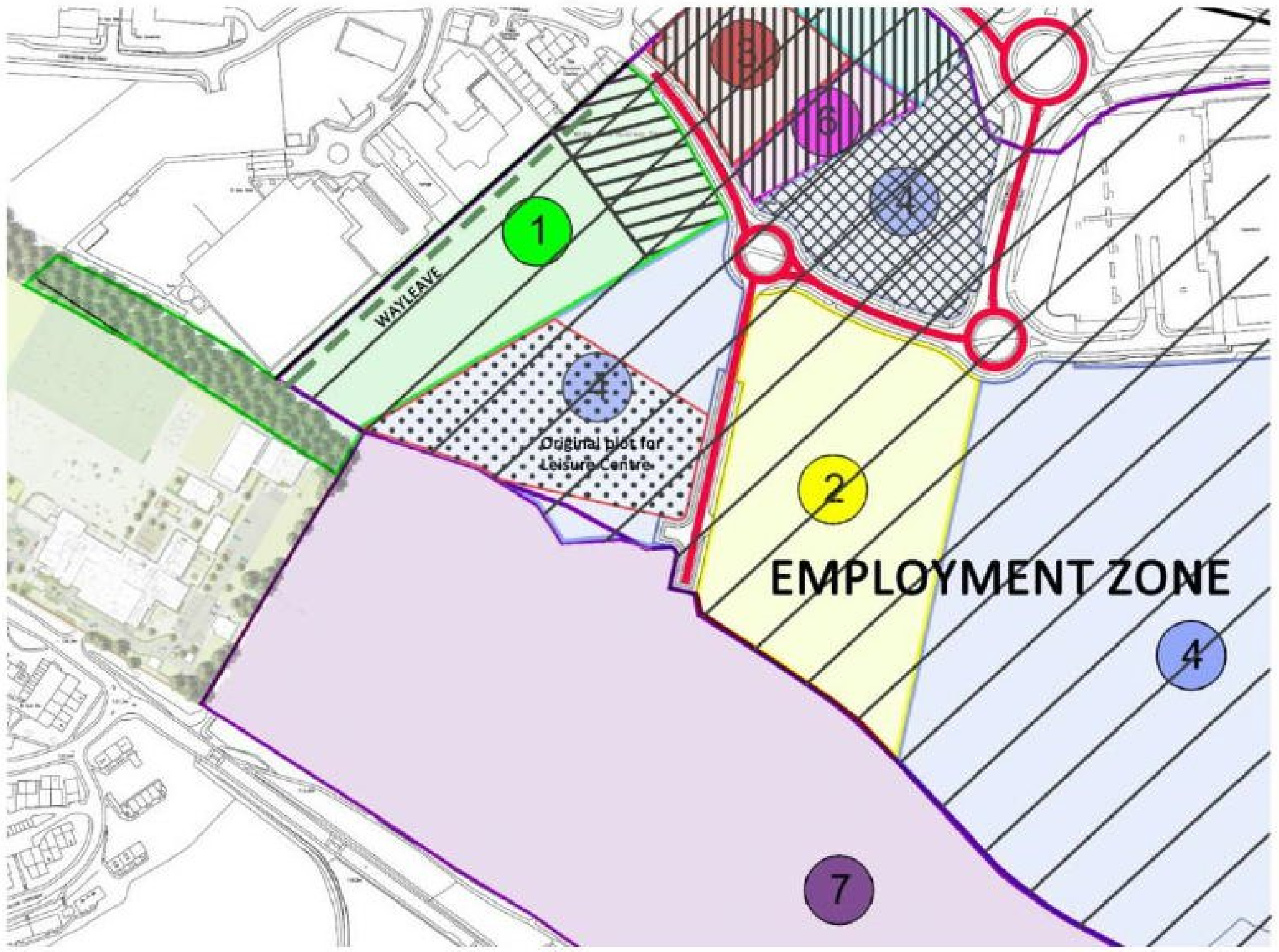
SITE LOCATION AND SETTING

The Council's preferred site for the proposed leisure centre is located as indicated by the redline boundary on the aerial photo opposite. The site is located approximately 1.1km to the south east of Whitfield, 2.7km to the north-north west of Dover and is centred on National Grid Reference 631100, 144230. It is designated as Employment Zone.

Currently the proposed site comprises open farm land, occupying an area of around 5.26acres / 22,688m^2, bound to the North by Honeywood Parkway. The Northern part of the site is bound to the West by commercial developments off Kedleston Road and to the east by a spur road from Honeywood Parkway.

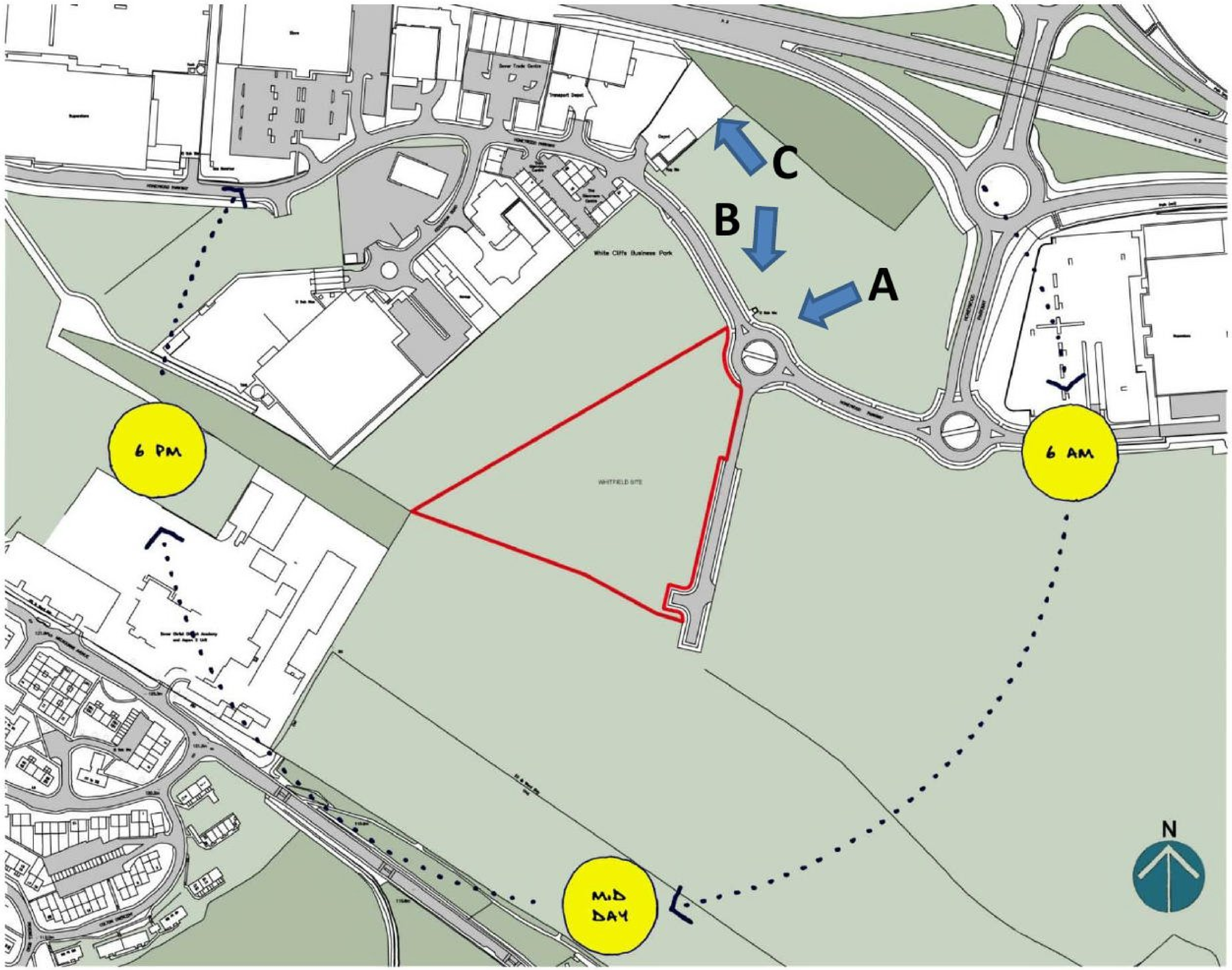
The proposed site lies in a fairly open area with some further commercial development to the North West and a little to the North East and with residential areas to the South and South East. Land to the North of the A2 is largely undeveloped, with the exception of Whitfield to the North West and smaller villages to the North and North East.





Site Appraisal

The site diagram below shows the red line boundary for the site and the sun path. The arrows labelled A, B and C indicate the position from which the accompanying photographs have been taken.



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Site Appraisal

LOCATION AND ASPECT

The building should be located to maximise visibility at from key viewpoints, such as towards the existing roundabout and main road.

SITE ACCESS

The intention is to use the existing spur from the established highway in order to minimise potential works and costs associated with affecting existing road networks

BUILDING DESIGN

The layout and design are a response to the brief, the conceptual framework of the spatial relationship diagram and the site

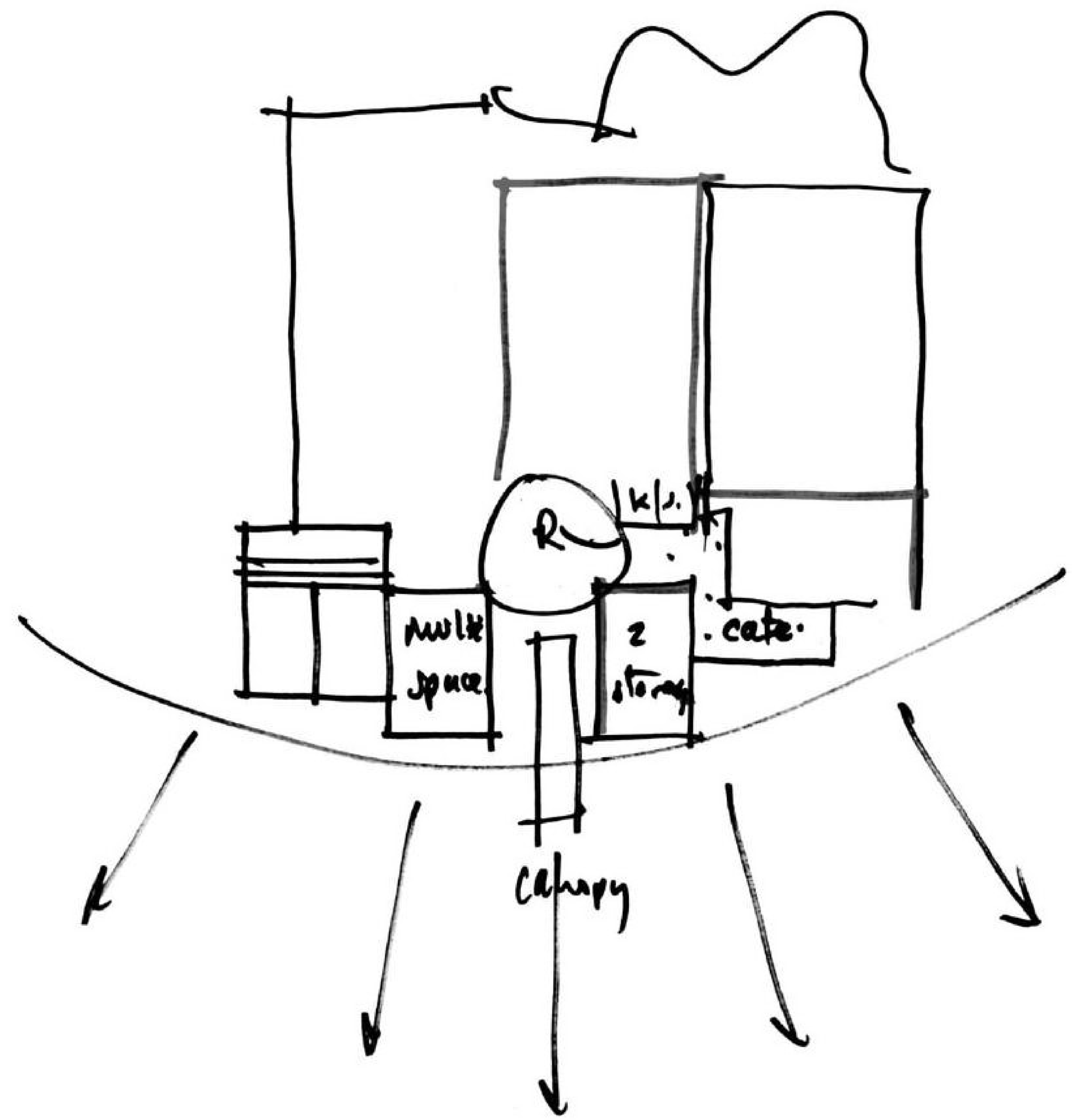
The concept of the building is to maximise the active frontages of the building facing key view points and major access routes to create a lively and vibrant facility, which is welcoming to the building users and also gives a good idea of what is going on inside the building. Essentially, the activities themselves act as a shopfront for the new leisure centre.

The building is roughly divided into three key elements:

- Wet side leisure – the pools. Highly serviced, and with specific design requirements and technical design criteria
- Dry side leisure – The four court sports hall, squash courts, studios and fitness suite
- A central service spine – wet and dry change facilities, back up, stores and admin spaces.

In addition, a double height reception space overlooked by the fitness suite, a café with views into key spaces and spilling out onto an external terrace, and a clip n' climb facility will all add to the vibrancy and experience.

The aim is to distil and resolve these many, varied and often conflicting factors into a clear, legible and readable architectural concept.



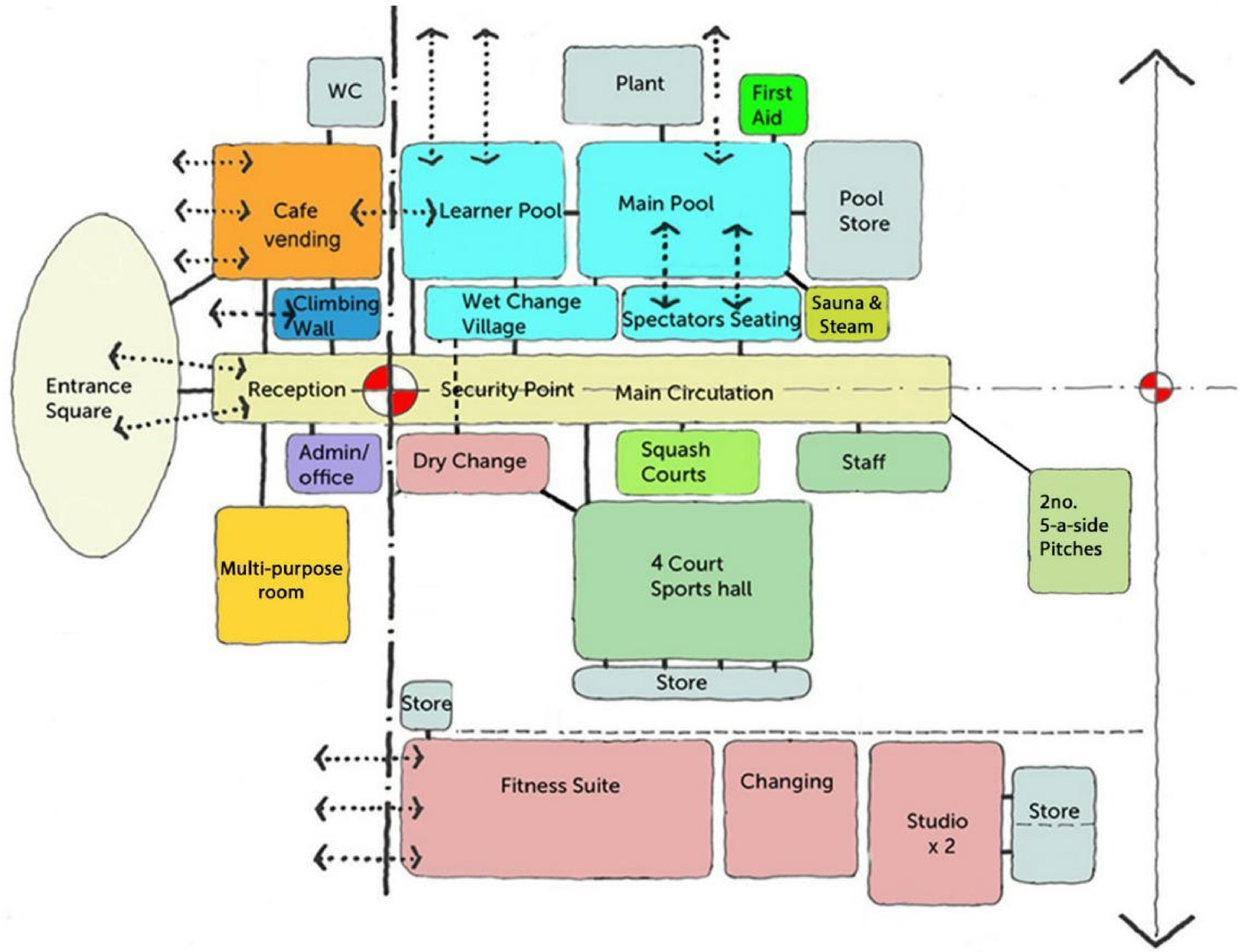
Concept Design

Concept Design - Relationship Diagram

Leisure centres are complicated building types, with numerous different requirements for each space. Some spaces work best next to each other whilst others are better further apart; some spaces require public access and some must remain private with secure access. Other adjacencies may be desirable such as a view from a cafe area into the pool space. Some room relationships are an inherent part of a leisure building brief, others may be specific client requirements affected by political, economic or market factors.

In each project, we try to examine these spatial relationships by creating a simple and clear concept diagram of how these linkages might work in the proposed building design. It is not a building plan, but rather a method of taking a complex brief and understanding how spaces might fit and work together.

It is a very useful design tool in the early stages, and we refer back to this diagram as the building develops to ensure that key spatial relationships are maintained throughout the design process, from first concepts to delivery on site.



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Concept Design - Site Plan

The agreed site plan is included opposite. This shows the arrangement of the following elements of the development.

- Leisure Centre
- Two five-a-side external football pitches
- Parking for minimum 250 cars.

The leisure centre is located close to the Northern corner of the site boundary, with five a side pitches adjacent to the sports hall and outdoor changing rooms. The car park is wrapped around the building to the South, the main entrance directly access from the pavement on the existing access road.

The building is in a prominent position, close to the existing roundabout, increasing visibility.

The main entrance is visible from both the roundabout and the access road, and whilst there is a benefit in hiding the car parking behind the bulk of the building from view of the main road, the building location does result in some long distances between the main entrance and the parking, in particular, towards the Western corner of the site.

This location has a number of benefits:

- More breathing space for the building – Not jammed into the corner of the site
- Improvements to landscaping and setting – In particular, when viewed from the existing roundabout, and the potential to create improved pedestrian links
- Improved connection to parking - Proximity of parking to the main entrance, in particular accessible bays.

BUS AND COACH DROP OFF

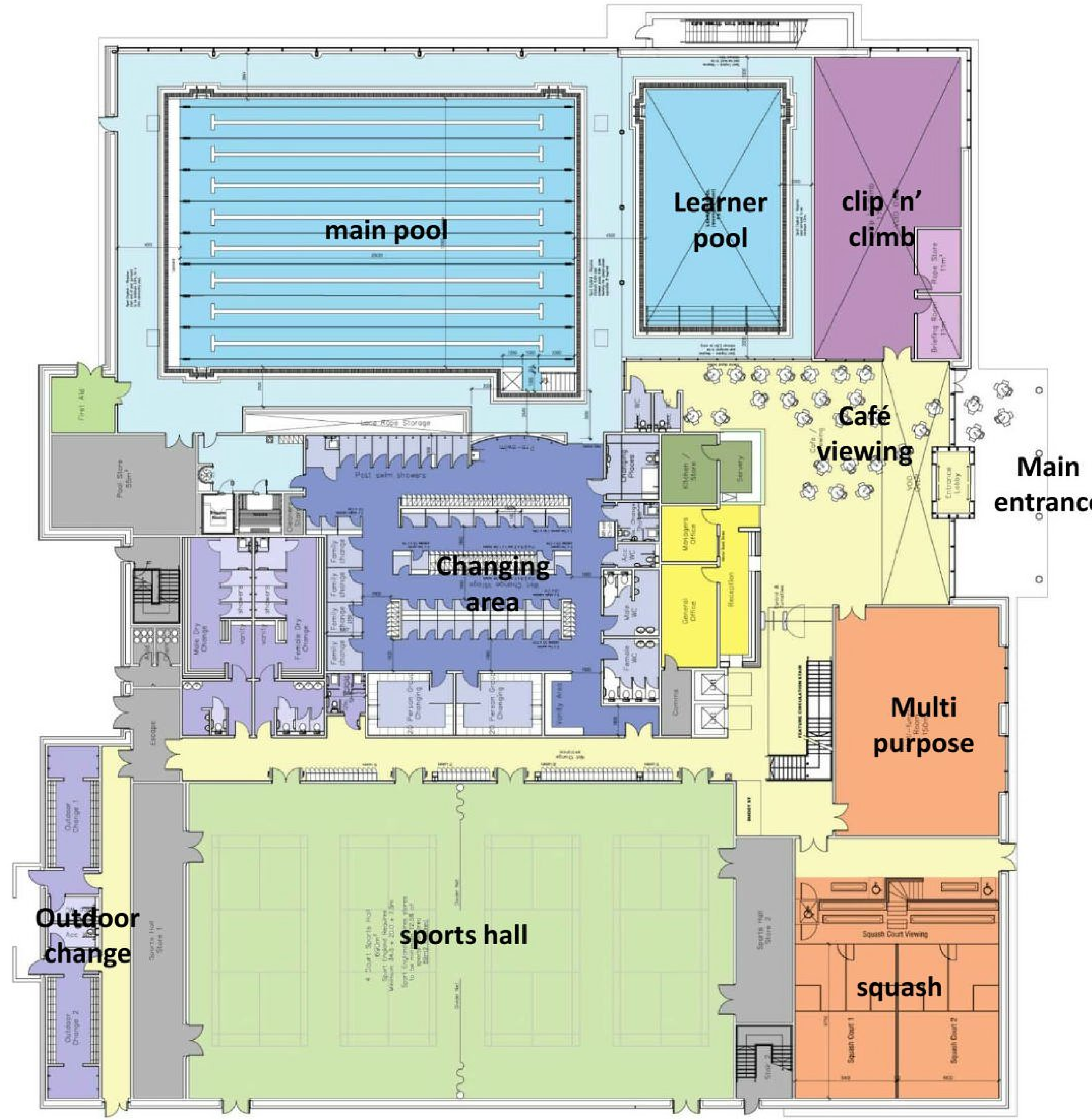
We have indicated a bus layby directly opposite the proposed main entrance to the building. This seems the simplest and easiest to incorporate. An alternative would be to incorporate a loop within the site with two coach bays adjacent to the sports hall. Final design is to be considered at next stage.

Concept Design - Ground Floor Plan

The following design features are included in the ground floor plan, which is shown opposite:

- Main entrance highly visible facing the main road, framed by a high level canopy and full height glazing to allow natural light into the space
- Full height void at main entrance overlooked by windows to fitness suite
- Reception, admin offices and security control point for the building located directly opposite main entrance
- Clip n' climb space directly adjacent to reception and visible upon approach to the building from outside, occupying a two storey high space
- Café area with views into learner pool and clip n' climb, with link to external café tables
- Multipurpose room at ground level for functions and children's parties etc adjacent to reception
- Two squash courts with spectator seating
- Main stair access to upper floor with roof light above allowing natural light from high level
- Main pool and learner pool visible from car park
- Wet change village with direct access to pools
- Four court badminton sports hall accessed via circulation corridor
- Dry change area directly opposite the sports hall
- Outdoor changing rooms accessible by people using the external five-a-side football pitches
- First aid, store rooms and plant space.

NOTE – Allowance made for basement pool plant which may be relocated to ground level during detailed design stage



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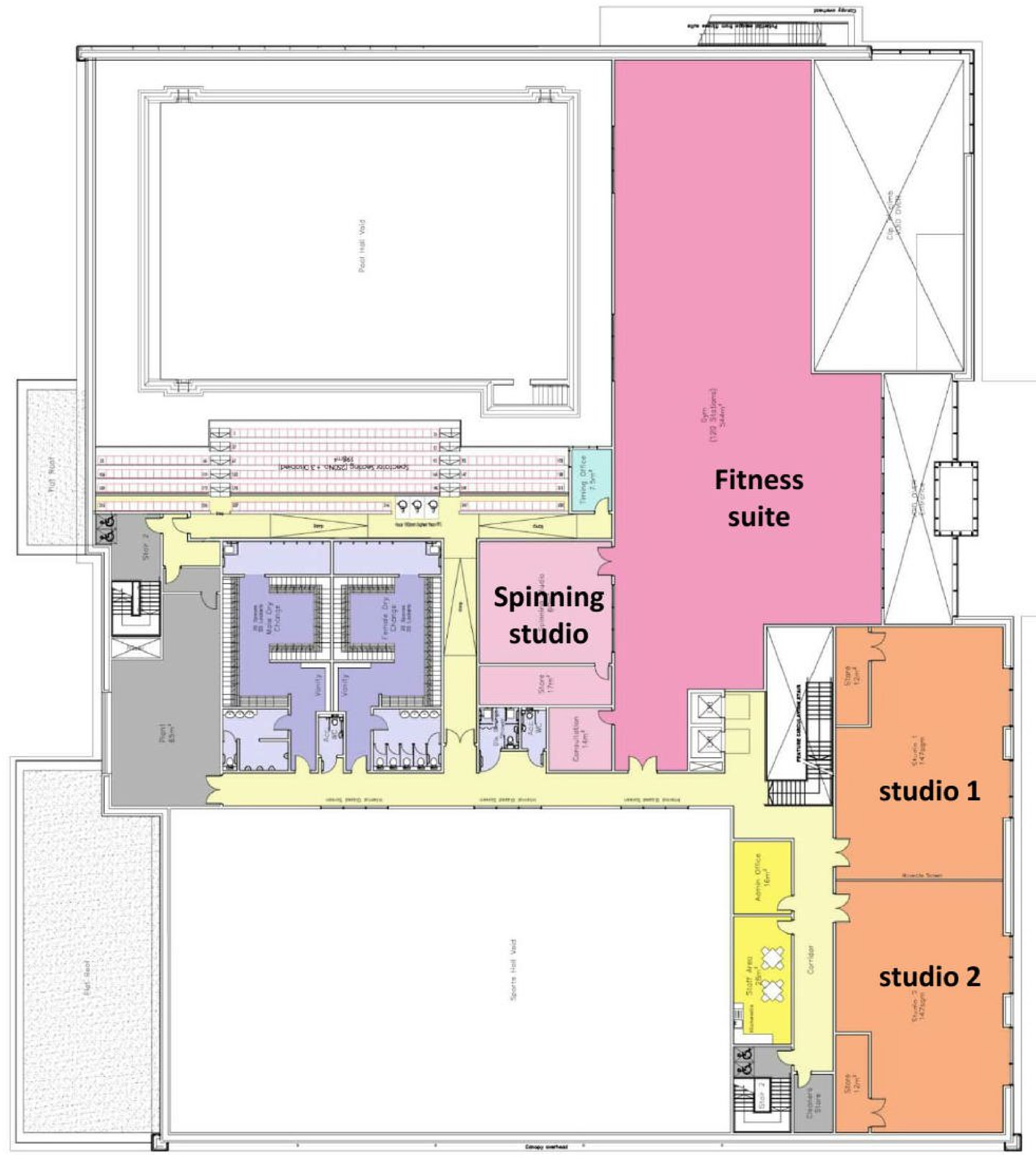
Concept Design - First Floor Plan

The following design features are included in the first floor plan, which is shown opposite:

- Main spaces organised along key facades to maximise active frontages
- Full height void at main entrance overlooked at high level by windows from the fitness suite to create a dramatic and dynamic space filled with natural light
- Fitness suite built over the learner pool and with potential views to exterior facing the roundabout and main road; views into the full height void at reception, into the void above the clip n' climb space and into the main pool area at high level.
- Separate dedicated spinning studio
- Two studios easily accessible and visible form the exterior, facing the proposed car park and existing access road
- 250 spectator seats overlooking the main swimming pool
- Dry changing areas
- Staff rest room
- Stores and plant space.

NOTE – Allowance made for additional plant space at roof level which is to be designed in further detail at the next design stage.



Concept Design - Schedule of Accommodation

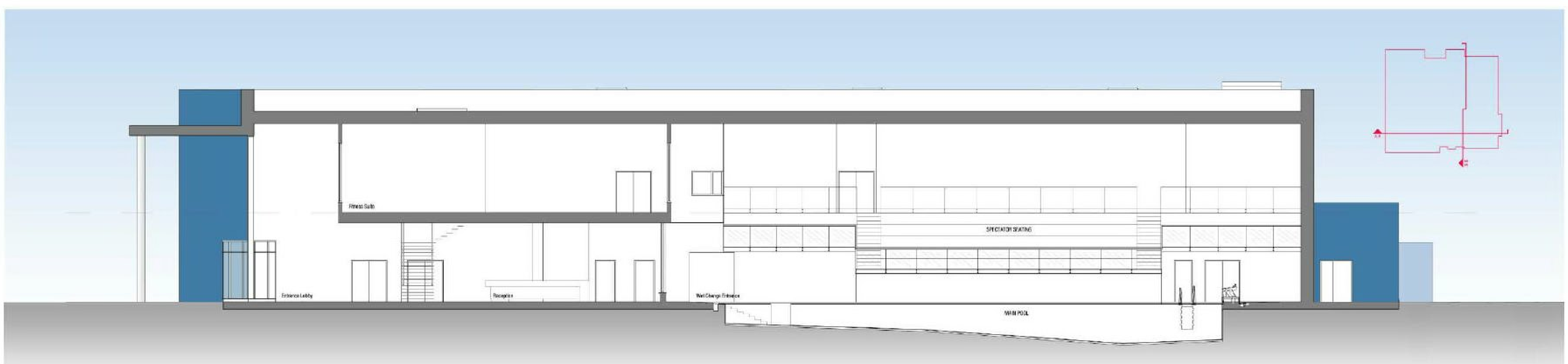
A schedule of areas for the preferred option is included in the following table:

	Area type	Area (m²)
Basement		
	Basement plan	100
	Net useable area	100
	GIFA	**100**
Ground Floor		
	4 court sports hall	690
	Sports hall store 01	65
	Sports hall store 02	42
	Learner Pool	228
	Main Pool hall	746
	Pool store	56
	Sauna	7
	Steam	6
	Sauna/Steam lobby	23
	Drench shower	4
	Chemical store	3
	Acid store	3
	First aid	14
	Cleaners Store	4
	Wet Change	289
	Group change 01	21
	Group change 02	21
	Changing places	12
	Access wc	4
	Unisex Acc. Change/Shower	6
	Female Wc	13
	Male Wc	13
	CHANGING VILLAGE TOTAL	**379**
	Squash Courts	125
	Squash Court Viewing	86
	Outdoor Change (inc. Corridor)	113
	Multi-Function Room	150
	Clip 'n' Climb	152
	Briefing Room	11
	Rope Store	11
	Entrance lobby	8
	Circulation	264
	Reception	27
	General / Admin Office	23
	Comms Room	8
	Duty Managers Office	12
	Access wc	4
	Access wc	4
	Kitchen	15
	Servery	12
	Café / Viewing	122
	Buggy Store	7
	Unisex Acc. Change/Shower	6
	Male Dry Change	39
	Female Dry Change	39
	Male Wc	15
	Female Wc	15
	Lifts	7
	Escape Lobby	17
	Stair 02	17
	Stair 03	16
	Net useable area	**3,595**
	GIFA	**3,733**
First Floor		
	Fitness gym	545
	Spinning Studio	60
	Store	19
	Consultation Room	14
	Male dry change	66
	Male Wc	21
	Female Dry Change	66
	Female Wc	21
	Access Wc	4
	Access Wc	4
	Disabled Shower WC Change	6
	Spectators seating	206
	Timing Office	9
	Studio 1	147
	Studio 1 Store	13
	Studio 2	147
	Studio 2 Store	13
	Staff Area	28
	Admin Office	16
	Plant Room	80
	Cleaners Store	8
	Circulation	129
	Stair 02	8
	Stair 03	14
	Stair 3 Lobby	8
	Net useable area	**1,652**
	GIFA	**1,715**
Roof		
	Roof top plant	300
	Net useable area	300
	GIFA	**300**
Total GIFA	Not including roof plant	**5,548**

Concept Design - Typical Sections

Typical sections of the building are provided below:

SECTION A-A



SECTION B-B

Concept Design - Elevations : Materials

Building volumes, massing and detail are indicative at this stage, for further discussion at the next detailed design stage. However, the general guiding principles are:

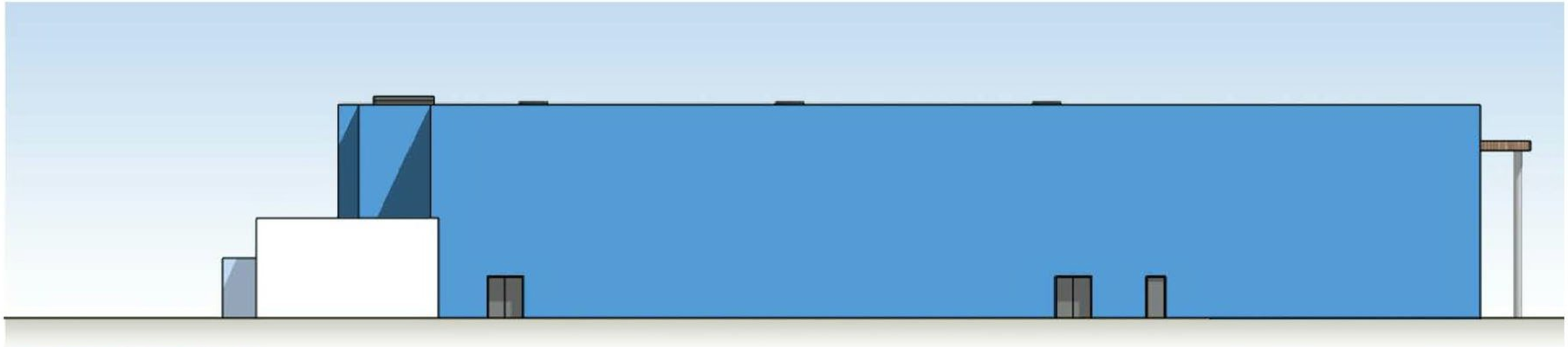
- Forms and massing are simple to maximise space efficiency and to minimise potential cost.
- Natural daylight will be introduced where possible, for example the full height screen at the main entrance and a roof light above the main stair.
- Glazing to pool halls can provide natural light which is desirable, but can produce potential glare and heat gain which are unwanted. There is also a delicate balance to be struck between visibility of the function of the space, and unwanted overlooking. We propose a larger element of glazing to the main pool, which could be partially or completely obscure glazed. For further consideration and discussion.
- Full height canopy to signify and identify the main entrance.
- Full height glazing to the corner of the two storey clip n' climb facility facing the main roundabout for maximum visual impact.
- Polyester powder coated aluminium thermally broken curtain walling for larger expanses of glazing, with smaller windows in a matching material and palette.
- Signage feature facing the roundabout, and hiding an escape stair behind.
- In general, render is proposed as the main external façade material. This allows different elements within the building to be expressed externally if desired. In addition, render can provide a welcome splash of colour suitable for this building type.

All colours and materials are to be agreed following further consultation.

An exploration of alternative materials for the external facades

Concept Design - East & South Elevations

Typical elevations are provided in the following pages:



SOUTH ELEVATION (SPORTS HALL)

EAST ELEVATION (FRONT)

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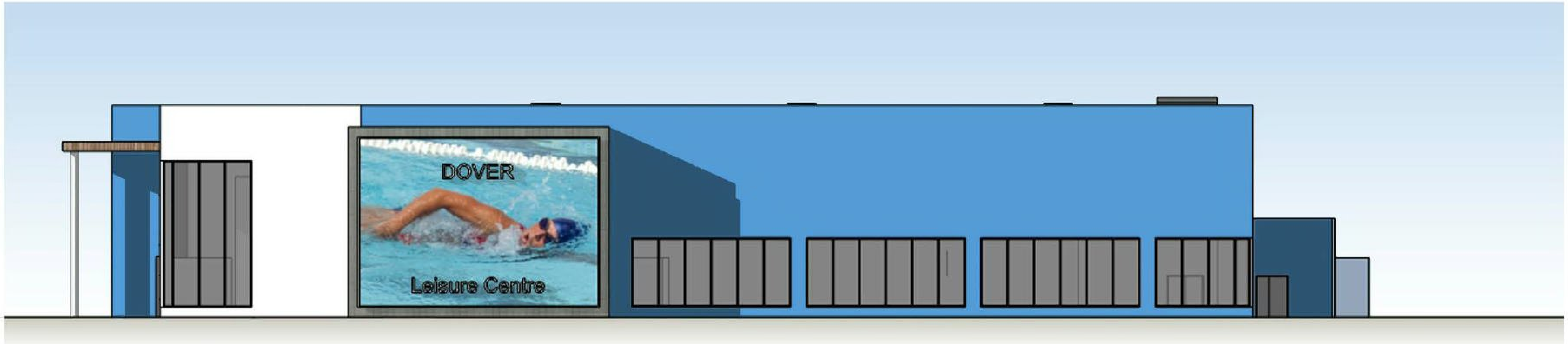
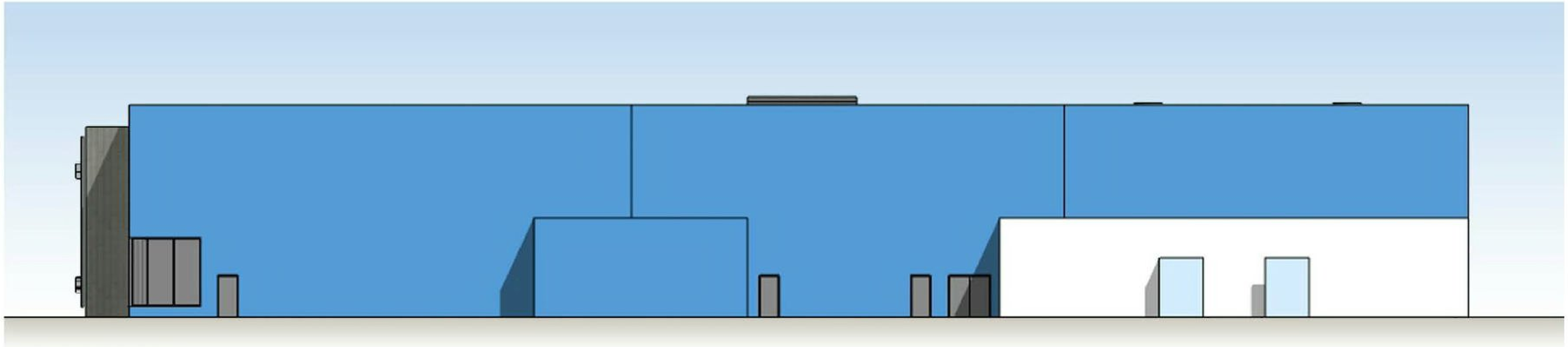


NORTH ELEVATION (POOL HALL)



WEST ELEVATION (REAR)

Concept Design - 3D Images – Massing & Volume

A selection of 3D visualisations of the building are included in the following pages

Concept Design - 3D Images – Massing & Volume

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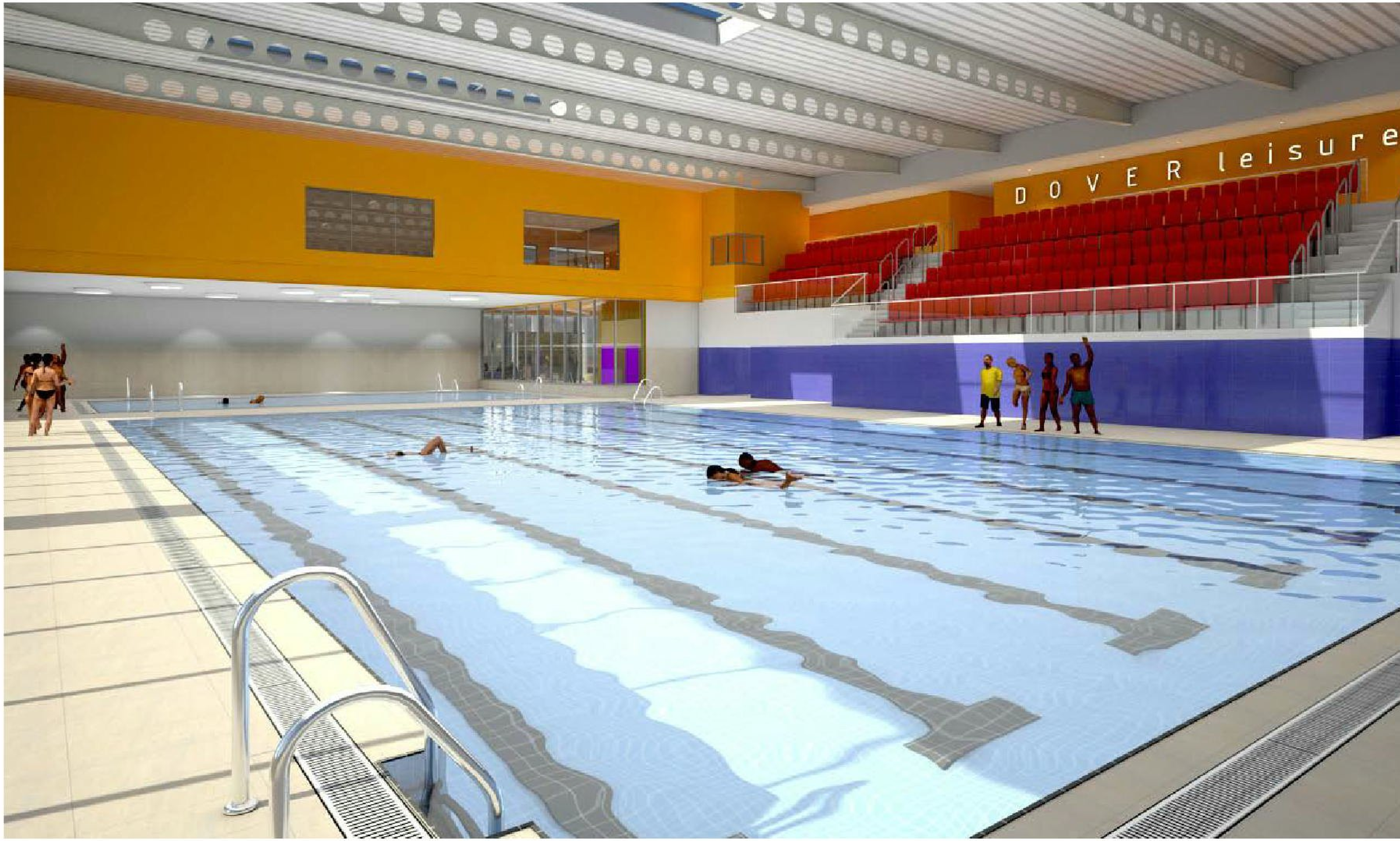
Concept Design - 3D Images – Massing & Volume



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Concept Design - 3D Images – Massing & Volume

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Concept Design - Precedent Images - Internal












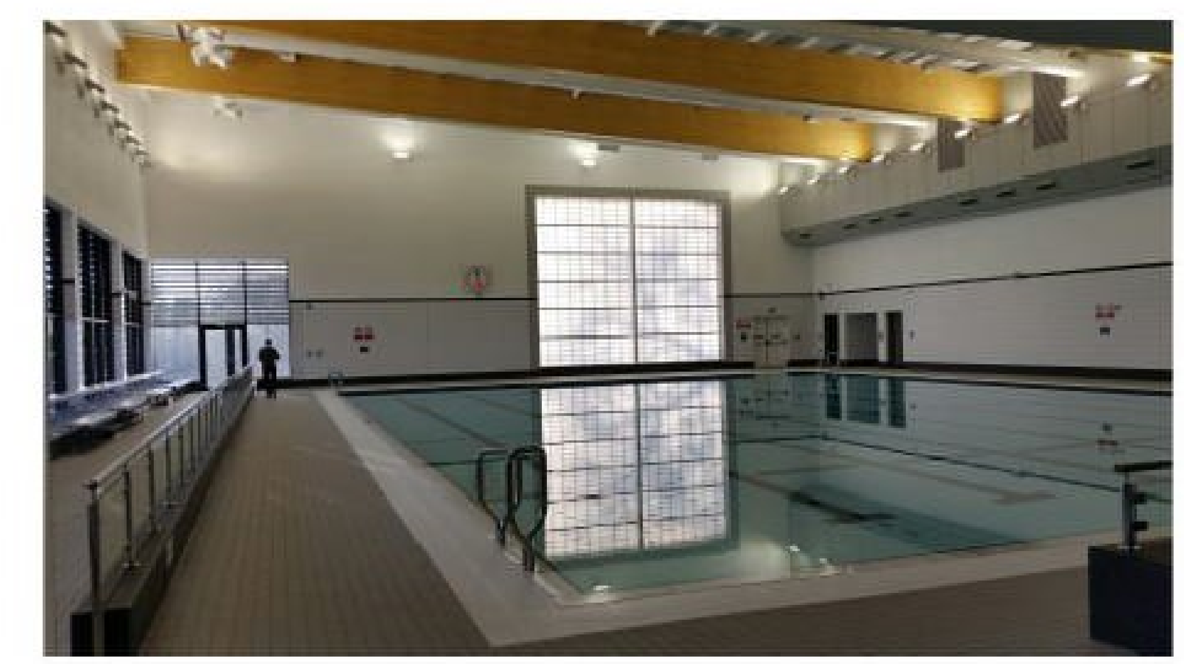


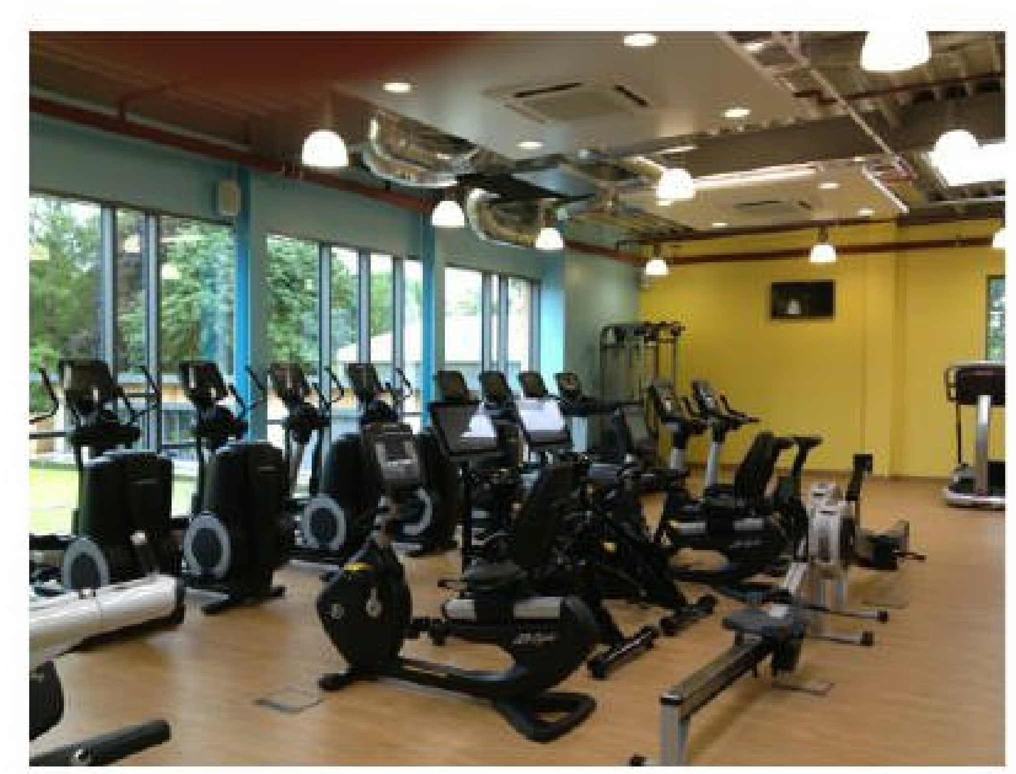


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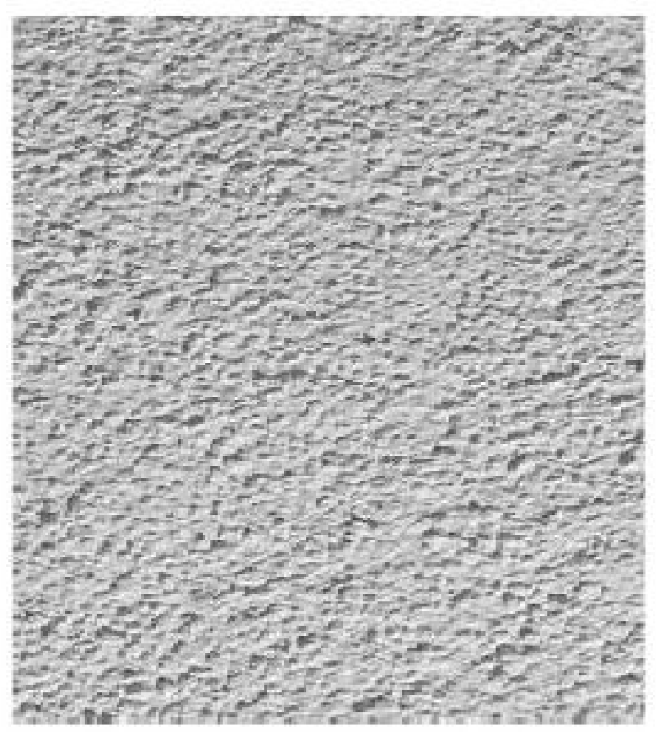
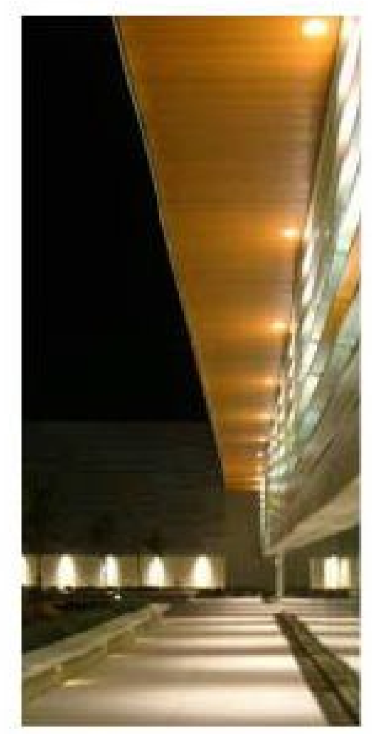
Concept Design - Precedent Images - External





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Civil and Structural Engineering

Civil and Structural Engineering

SUMMARY OF REPORT FINDINGS

Engenuiti has been appointed by GT3 Architects to provide civil and structural engineering design services for the proposed new leisure centre for Dover.

The purpose of this Structural & Civil Engineering Feasibility RIBA Stage 2 Report is to describe the civil & structural engineering concept design of the proposed development to support the preliminary cost estimates for the project.

The proposed leisure centre is located in Whitfield, Dover. The site postcode is CT16 3FH. The site location is south of Honeywood Parkway and east of The Glenmore Centre.

The site is currently a greenfield location bounded by Honeywood Parkway and a spur road to the east of the site.

The proposed leisure centre is a new build facility. The new facility will be designed around the following accommodation mix:

- 8 lane 25m pool
- Learner pool with moveable floor
- Wet changing village
- Activity zone around a new café space
- 4 court sports hall with associated changing
- Treatment rooms
- Gymnasium
- 2 large dance studios
- 2 Squash courts
- Spinning studio.

The proposed building superstructure can be conceptually split into four key components as follows:

- Long-span roof structures over swimming pools, sports hall and studios (column free areas)
- Floor slabs to studio and office spaces supported on an regular grid of vertical support
- Secondary structure to façade and building envelope
- Swimming Pool structures

Several structural framing solutions can be applied to the proposed architectural form. The long span roofs can be framed using cellular steel beams, steel trusses or glulaminated timber beams or trusses. The floor slabs to studio and office areas can be frames using steel columns and beams with composite reinforced concrete slabs cast on metal deck or using precast concrete soffit panel systems. Cross Laminated Timber (CLT) floor options are also possible.

Secondary structural framing to building envelope can be through the use of metal decks, timber cassettes, composite panel systems, concrete block walls, cold formed steel backing systems and CLT panels.

The swimming pool structure can be constructed out of in situ reinforced concrete, stainless steel systems or sprayed concrete.

The British Geological Survey (BGS) online map indicates that the sites bedrock geology is Margate Chalk Member. The sites superficial deposits are of Clay with flints formation, consisting of clay, silt sand and gravel.

Based on the desktop study of the local geology and borehole data available on the BGS website we suggest that the proposed structure and ground conditions may be suitable for shallow pads and ground bearing slabs founded on the chalk.

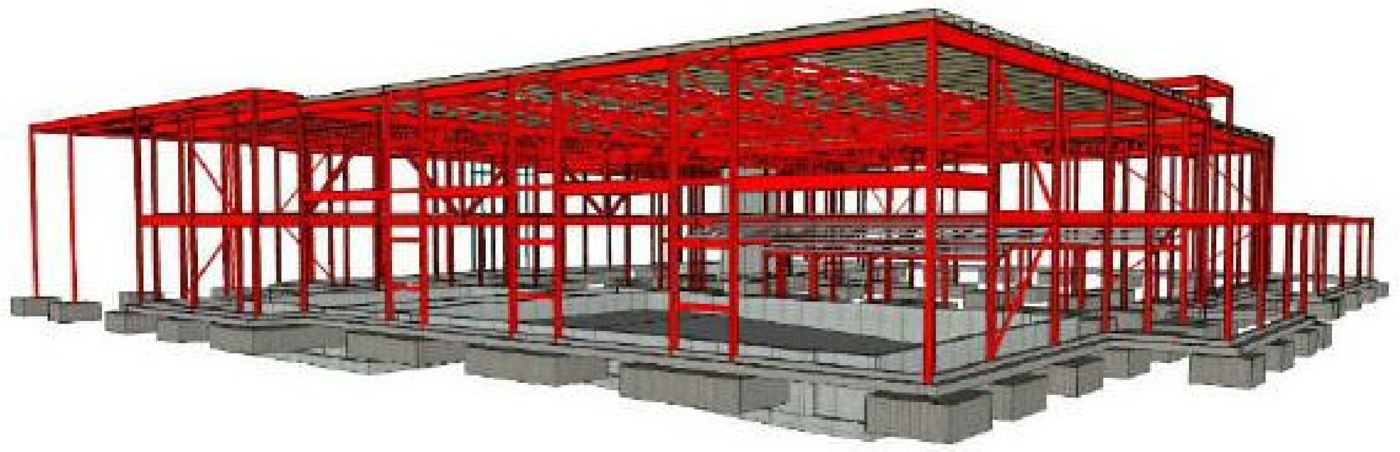
Our experience of leisure centre construction suggests that shallow foundations and a ground bearing pool structure are the most favoured starting point from a cost perspective but that allowance should be made for a piled foundation solution until further ground information is available.

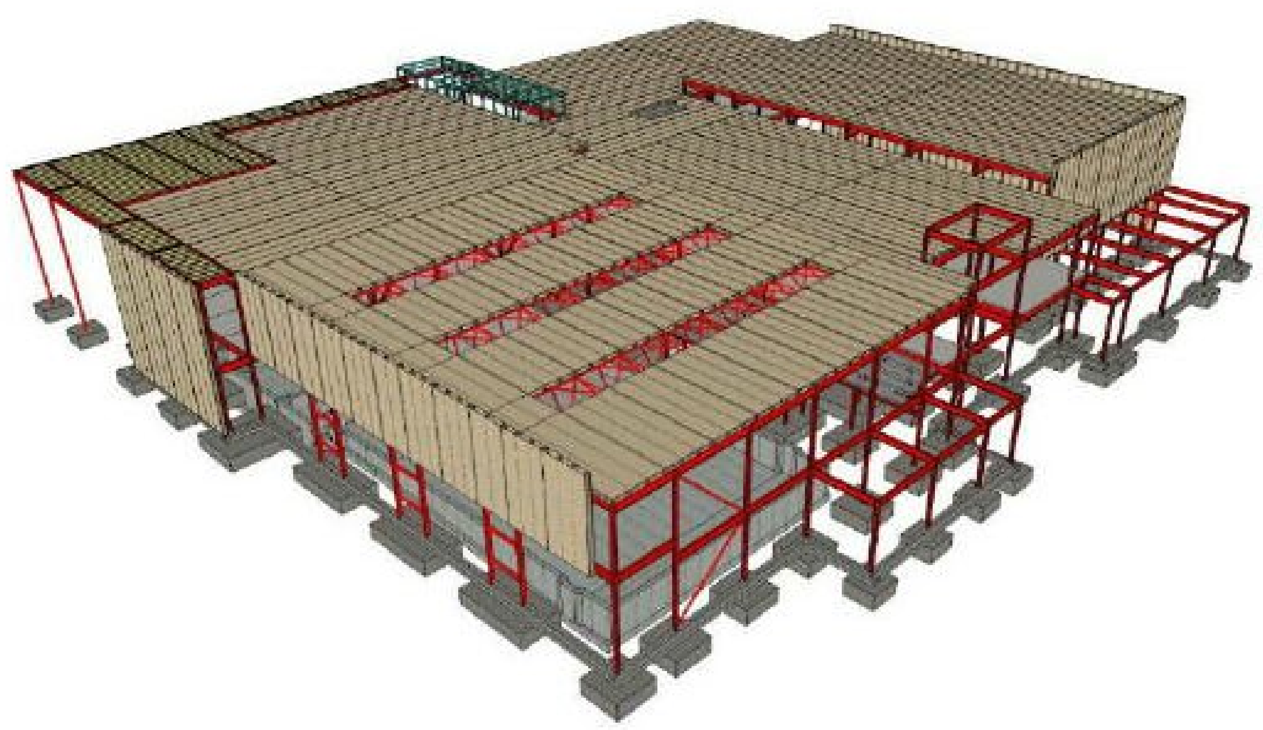
Applications and consultation will be required to Southern to agree a method of discharge and flow rate from the swimming pools. Additional applications will be required to Southern Water if connecting to the public sewer network and also to the Environment Agency if the final proposal incorporates discharge to ground.

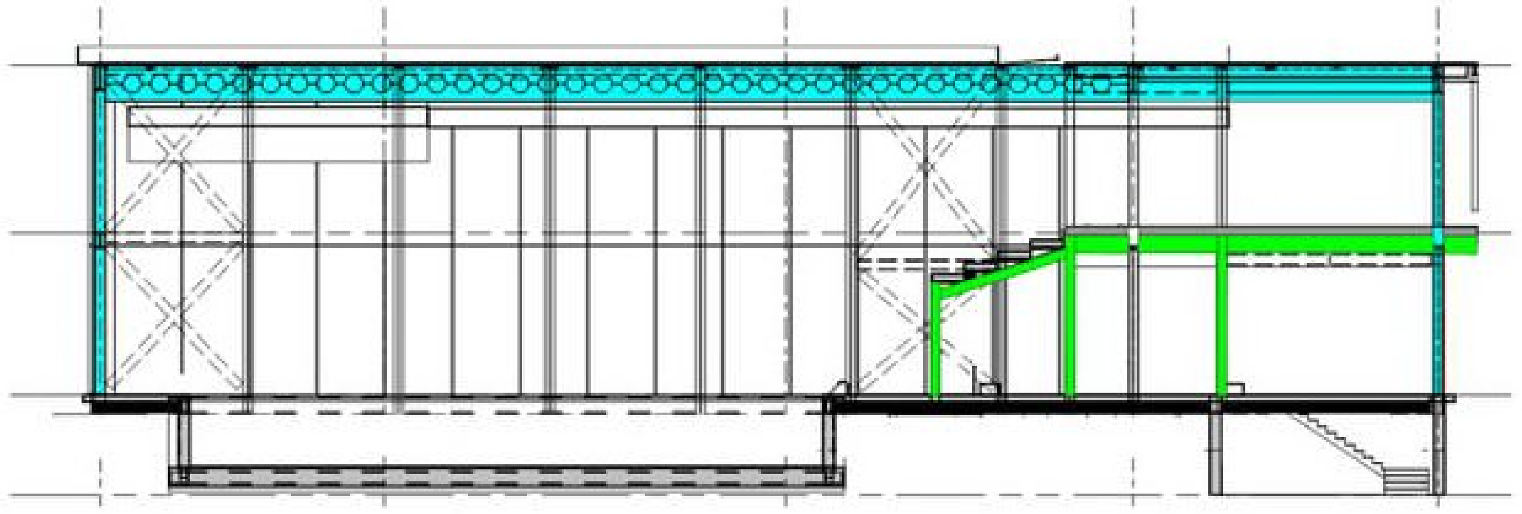
As the development is considered Major, the Local Lead Flood Authority: Kent County Council SuDS pro-forma will need to be completed as part of the planning application process.

The feasibility of discharging surface water to ground through additional SuDS measures will also be studied and considered further at the next design stage, incorporating results from infiltration testing.

At this stage we suggest using a baseline structural option of a steel frame with long span truss over the swimming pool and long span cell beam roof, shallow reinforced concrete foundations and in situ RC swimming pool. We have progressed the cladding design using a timber cassette envelope solution.







Mechanical and Electrical Engineering

SUMMARY OF REPORT FINDINGS

The leisure centre is to incorporate a 25m. x 8 lane main pool and a 15m. x 8.5m. teaching pool.

Filtration & Water Treatment Systems

The filtration and water treatment systems are to incorporate medium pressure sand filtration with PAC (polyaluminium chloride) for coagulation, chlorine disinfection in the form of sodium hypochlorite (complimented by UV treatment) and hydrochloric acid for pH correction.

The systems are to be designed in accordance with the PWTAG Guidelines together with the relevant criteria as follows:

Main Pool

Volume	638m^3
Turnover	3 hours
Hourly Flow	213m^3
Filters	2 x 2.4m. diameter vertical
Filter Area Total	9.04m^2
Filtration Rate	23.56m./hour
Maximum Instantaneous Bathing Load (based on circulation rate)	125

Teaching Pool

Volume	120m^3
Turnover	1 hour
Hourly Flow	120m^3
Filters	2 x 1.8m. diameter vertical
Filter Area Total	5.09m^2
Filtration Rate	23.6m./hour
Maximum Instantaneous Bathing Load (based on circulation rate)	71

Balance Tank

A balance tank is to be incorporated for each of the systems and these are to be located under the pool surround at the side of each respective pool. The positions and physical sizes of the tanks are to be agreed with the Architect and Structural Engineer and tanks are to comply with the requirements in relation to the Regulations on 'Access to Confined Spaces' and the Recommendations laid down by PWTAG.

Main pool minimum operating volume	35m^3
Teaching pool minimum operating volume	20m^3

Filter Backwashing

It is proposed that filter backwashing will be carried out at the end of each operating day. Under normal bathing load conditions it will probably be necessary to wash each filter once per week, but this may increase during heavy bathing load periods.

At the current time, on most new swimming pool projects it is usual practice for the local Water Company to limit the flow rate to foul to within approximately 5 litres/second. If this Regulation is applied on this particular contract it will be necessary to include an attenuation/backwash holding tank as part of the drainage systems. The size of the tank is to be based on the following:

Item	Each of the Main Pool Filters	Each of the Teaching Pool Filters
Backwash flow rate	38 litres/second	22 litres/second
Length of backwash process	7 minutes	7 minutes
Volume discharged	15.96m^3	9.42m^3

Assuming that the attenuation tank is allowed to drain after backwashing each filter, the tank would have to have a minimum operating volume capacity of 16m^3. If it is necessary to design the system to enable two filters to be washed consecutively, then the volume of the tank would have to be increased to 32m^3.

The engineer responsible for drainage is to determine how the tank is to be drained to foul and vented.

Drainage Requirements

Approximately five drainage gullies will be required in the floor of the filtration plantroom.

Drench shower drainage still to be agreed

Services

Electrical

Electrical supplies will be required as follows:

Main filtration plantroom	50Kw.

All the above supplies are to be 415 volt, 3 phase and neutral and the above figures do not take into account power factor correction.

Water Supply

A makeup water supply will be required, terminating at an agreed point in the filtration plantroom and this should be based on a flow rate of 2 litres/second. The maximum flow rate will be required after filter backwashing for pool water makeup. Filter backwashing is usually carried out at the end of the operating day, which allows the pool water makeup to operate overnight when the demand for water in the remainder of the building is low.

Additional water supplies will be required for the following:

- The sink in the main plantroom.
- Hose down point in the main plantroom.
- Hose down point in each of the chemical rooms.
- Drench shower in each of the chemical rooms.

Mechanical and Electrical Engineer

Heat Requirements

We assume that low pressure hot water will be provided to initially heat the pool water, raising the volume of the water temperature by 0.5^{0}C per hour. Plate heat exchangers should be provided as part of the filtration contract and it is usual practice, for the controls on the low pressure hot water side, to be provided by the mechanical contractor. LPHW – 70^{0}C supply and 50^{0}C return.

Pool	Anticipated Pool Water Temperature	Anticipated Heat Load
Main	28 - 29^{0}C	371Kw.
Teaching	29 - 30^{0}C	70Kw.

Ventilation

Chemical Rooms

Whilst the PWTAG Guidelines indicate that natural ventilation is acceptable it would be preferable to incorporate forced ventilation, the recommended rate being four air changes per hour.

Filtration Plantroom

The mechanical and electrical consultant should assess whether or not forced ventilation is required in the main plantroom, giving consideration to the fact that this room also accommodates the boilers, electrical equipment etc.

Balance Tank

A balance tank is to be incorporated for each of the systems and these are to be located under the pool surround at the side of each respective pool. The positions and physical sizes of the tanks are to be agreed with the Architect and Structural Engineer and tanks are to comply with the requirements in relation to the Regulations on 'Access to Confined Spaces' and the Recommendations laid down by PWTAG.

Drainage and Flood Risk

Drainage and Flood Risk

SUMMARY OF REPORT FINDINGS

EXISTING SITE TOPOGRAPHY

The development is triangular in shape and is located on a greenfield site of 2.26 hectares. The site can be seen to fall from a high point of 126.0m AOD on the southern boundary to a low point of 122.0m AOD on the northern boundary adjacent to Honeywood Parkway.

EXISTING DRAINAGE

Surface Water

There is no surface water outfall from the existing site with any runoff soaking into the ground. Southern Water asset plans show there to be no public sewers within the development site itself with the nearest surface water sewer being a 225mm sewer located approximately 40m from the North West of the site in Honeywood Parkway, which in turn discharges to soakaways. It is very unlikely that these soakaways will have any additional capacity for the proposed development. There are no watercourses on the site.

Foul Water

There is no foul water outfall from the existing site. The nearest foul water sewer is a 225mm sewer in Honeywood Parkway which drains to a pumping station located approximately 40m from the North West corner of the site. From this pumping station the foul water is pumped via a rising main to the South.

Geology

A report from the British Geology Survey has been obtained to assess the properties of the sub surface and the suitability for the installation of infiltration SUDs on the site. This assesses constraints such as geology, ground stability and groundwater quality protection.

The report summarised that the site is underlain by the Margate Chalk member made up of chalk. Superficial deposits made up of clay, silt, sand and gravel are seen to overlie the bedrock.

The report summarised that there is a very significant possibility of localised subsidence that could be initiated or made worse by infiltration. The bedrock deposits are likely to be free draining with very high infiltration rates expected.

Any infiltration would therefore need to be at depth within the bedrock via deep bored soakaways.

PROPOSED DRAINAGE

The proposed drainage system for the new leisure centre will comprise of a separate foul and surface water gravity system.

Surface Water

Given that there are neither surface water sewers or a watercourse in the vicinity of the site, the only method available for the disposal of surface water will be via infiltration. Given the local geology and the risk of subsidence with additional infiltration at a shallow depth, the likely method for infiltration will be via deep bored soakaways. A desktop site investigation study is currently being carried out which will confirm the suitable methods for infiltration.

Surface water from the roof and hardstanding areas will be collected in underground sewers and will be taken by gravity to a number of deep bored soakaways on the northern boundary.

Specific on site testing will determine the infiltration rate and in turn the number of soakaways that will be required. These may need to be supplemented by below ground attenuation tanks.

Foul Water

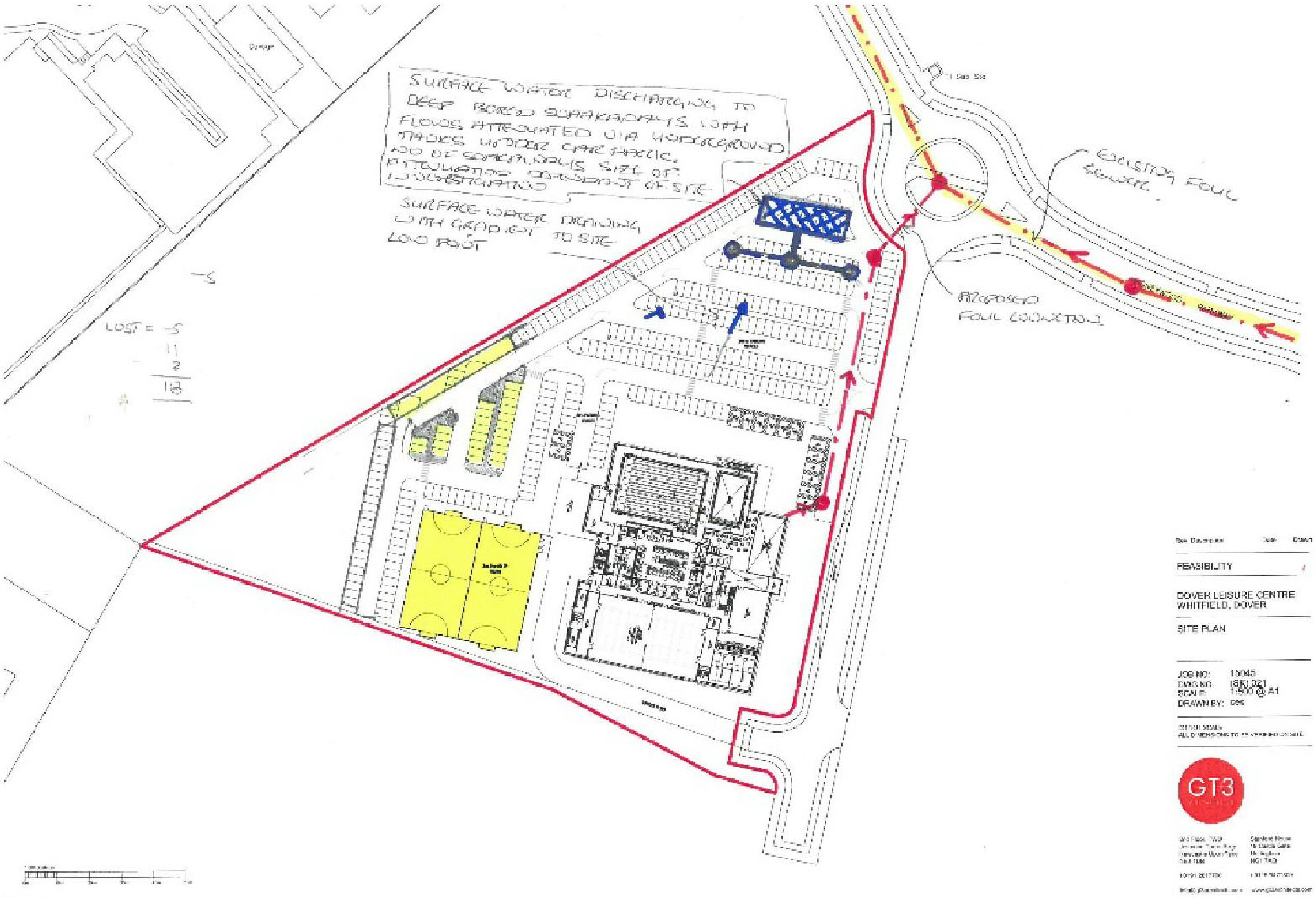
Foul water from the new leisure centre development will be collected in a system of underground sewers, which subject to available capacity will discharge into the existing foul water manhole reference 2305 located Honeywood Parkway . The foul water capacity check when completed will identify any upgrades required to the existing infrastructure including sewers and pumping stations.

Flood risk

Based the Environment Agency flood maps, the site can be seen to be located entirely within Flood Zone 1 which is the lowest probability of flooding. All forms of development are appropriate within Flood Zone 1 and as such the site is considered to satisfy the sequential test.

Drainage and Flood Risk

The following sketch plan shows initial drainage proposals.



Transport

SUMMARY OF REPORT FINDINGS

Access

Access to the site is proposed from the southern arm of the Honeywood Parkway roundabout junction, which provides easy access to the A2.

Site Servicing

Site servicing will take place via a dedicated access to the south of the main entrance, reducing any potential conflicts with any vehicles, pedestrians and cyclists using the car park. A swept path analysis will be undertaken of the proposed layout with three different vehicle types; a refuse truck, a fire tender and a standard delivery vehicle.

Vehicle Parking

Kent County Council stipulates that the maximum parking standards for leisure centres is 1 space per 22m2. Based on a proposed total developable floor area of 7605m2, the maximum number of parking spaces is 345, therefore the proposed 340 spaces is considered to be acceptable in policy terms.

Cycle Parking

This will be provided in accordance with the minimum standards set out in the Dover District Council's standards to promote sustainable transport. The standards state 1 space per 10 patrons and 1 space per 10 staff. These will be located in a prominent position; more than likely within the plaza to provide convenient access to the main entrance.

Disabled Parking

The proposed design will comply with the latest version of the London Plan and Sport England guidance, which stipulates that 6% of the total parking capacity should be allocated to disabled parking bays. Based on 340 parking spaces, this equates to 20 of which are allocated for disabled users.

Coach Drop-off and Parking Provision

A dedicated coach drop-off bay has been proposed on the western side of the access road immediately outside the main entrance to the proposed leisure centre to allow larger vehicles and groups of visitors to avoid conflicts with car park users. Coach parking will also need to be considered and provided.

Public Transport Accessibility

The site is conveniently located approximately 50m from two bus stops on Honeywood Parkway (stops B and Q); regular services to Dover town centre, Canterbury, Whitfield and Deal are served from these bus stops. Dover rail station is approximately 4 miles away from the site therefore is not realistically a likely mode of travel for staff or visitors at the centre.

Transport Assessment Scoping

A scoping exercise will be undertaken with Kent County Council Highways and Transportation. This will help to understand the assessment work required as part of the Transport Assessment that will accompany the planning application for the proposed development, including any traffic surveys and junction modelling required.

Trip Generation

A trip generation assessment will be undertaken using a first principle approach supplemented by the TRICS database.

Road Safety

Personal Injury Accident data will be sourced from Kent County Council and will be assessed to understand any local road safety concerns.

Travel Plan

A Framework Travel Plan will be produced as part of the planning application, which will set out the measures and targets that will be implemented at the leisure centre to encourage sustainable travel to and from the development.

BREEAM

SUMMARY OF REPORT FINDINGS

The Dover District Local Development Framework Core Strategy (Adopted February 2010) stipulates that all new non-residential developments >1000m^2 floor area must achieve BREEAM 'Very Good' rated certification.

BREEAM (Building Research Establishment's Environmental Assessment Method) is the world's most foremost environmental assessment rating system for buildings. The Whitfield Leisure Centre development will be assessed under the BREEAM 2014 New Construction (non-domestic) scheme and 'Other Buildings' criteria.

The assessment is typically split into three stages:

1. Pre-assessment: This is a non-certified stage outlining the credit strategy with regards to achieving the required rating.
2. Design stage: The design stage assessment is typically based on design stage drawings, specifications and assurances from the project team that the development will comply with BREEAM criteria. Following review of the design stage report by the BRE, an interim BREEAM certificate will be issued.
3. Post construction stage: This stage of assessment is based on the development as built. Providing compliance is evidenced, the final BREEAM certificate will be awarded following review of the final report and BREEAM assessor site inspection.

In addition to achieving a minimum score of 55%, achieving BREEAM 'Very Good' requires a number of mandatory and minimum requirements to be met. These are as follows:

- Ene 02 (Energy Monitoring): The first credit for sub-metering of major energy uses must be met.
- Wat 01 (Water Consumption): At least 1 credit is required for 'Very Good'. This requires a 12.5% improvement in water consumption over the notional baseline.
- Wat 02 (Water Monitoring): A water meter must be installed on the mains supply to the building. The meter must have a pulsed output or/and be connected to the BMS.
- Mat 03 (Responsible Sourcing of Materials): All timber
- procured for the project must be legally harvested and traded.
- LE 03 (Minimising Impact on Existing Site Ecology): The change in ecological value of the site as a result of the development must be no worse than -9.

A pre-assessment exercise was carried out between BDP Sustainability, BDP M&E, GT3 Architects and Engenuiti (civil and structural engineers). The BREEAM Assessor (BDP Sustainability) compiled an initial credit strategy for achieving BREEAM 'Very Good' based on location details and current drawings. A meeting was then held with the aforementioned parties at the GT3 offices on 1st June 2016 to discuss and review the strategy, highlighting any potential areas for improvement or any constraints of the project with regards to achieving the relevant credits. The pre-assessment and credit strategy was revised following this discussion. The revised model for achieving 'Very Good' is outlined Table 1.

Although only 55% is require for 'Very Good', a score of 61.75% is currently targeted. This allows for a 'buffer' should any further information come to light or any design changes occur that prohibit the award of any targeted credits.

The development has the potential to score well within the management, water, waste and materials sections. This will require careful planning and consideration regarding the BREEAM criteria related to these issues, baring in mind the 'time limited' credits which require actions by particular RIBA stages in order to be achieved.

Based on a site area of 22,688m2, assuming 100% of the pre-developed site is classed farmland (i.e. no border vegetation / hedges etc), then a minimum of 1,450m2 typical garden planting / possible green roof area (or a combination of both) would be required in order to achieve the 1 required LE 03 ecology credit (assuming the remaining 21,238m2 will consist of building and hard landscaping).

N.B. These are initial calculations, and further confirmation from an ecologist must be sought regarding any ecology-related decisions.

Section	Number of credits available	Number of credits targeted	Section weighting	Section score
Management	21	18	12.0%	10.3%
Health and Wellbeing	18	8	15.0%	6.7%
Energy	23	15	15.0%	9.8%
Transport	11	6	9.0%	4.9%
Water	9	6	7.0%	4.7%
Materials	14	9	13.5%	8.7%
Waste	8	6	8.5%	6.4%
Land Use and Ecology	10	4	10.0%	4.0%
Pollution	13	7	10.0%	5.4%
Innovation	10	1	10.0%	1.0%
			Total (target score):	**61.75%**

At this early stage it is though that the development may score poorly in the transport and land use and ecology sections. This is due to the location of the site in relation to amenities and public transport. A further constraint relates to the site's potion within a greenfield site, posing a threat to the ecology and surface water runoff credits.

It should be noted that early appointment of a BREEAM assessor is a further advantage to the project. This ensures that opportunities and obstacles in achieving the required rating are identified at an early stage, thereby facilitating a cost and time efficient route to certification.

Capital Costs

Capital Costs

SUMMARY OF REPORT FINDINGS

Capital cost estimates have been completed by Faithful + Gould. The Feasibility Cost Study is contained in Appendix 7. Included within the report is a Stage 2 Cost Plan, updated benchmarking exercise, schedule of information used in preparation of this cost estimate, a list of key assumptions and exclusions.

The purpose of this RIBA Stage 2 Cost Plan is to give a magnitude of capital cost to Dover District Council for the proposed new Dover Leisure Centre at the Whitfield site, Dover. The costs are based on the schedule of accommodation and concept design information supplied by the project team.

.The current projected capital cost is [redacted], indicating an increase of [redacted] from the Feasibility and Options Appraisal Study issued in October 2015. The reasons for this increase can be attributed to the increase in gross internal floor area by 330m , additional allowance for clip ‘n’ climb equipment, an increase in external works costs which are now based upon the current Whitfield site option and an increased allowance for sports fixtures, fittings and equipment.

The approximate cost for the optional addition of green roof to the proposed scheme is [redacted] inclusive of percentage additions for contingency, inflation and professional fees.

The estimated cost is an outturn cost and therefore inflation is included based on construction commencing in October 2017 with a 15-month construction period.

The overall Gross Internal Floor Area (GIFA) for the new build is 5,548m2 with an overall site area of approximately 22,688m2.

The Design Development / Construction Contingency has been reduced from 15% at feasibility stage to 12.5% in order to reflect the improved level of design information. This provides a contingency sum of circ[redacted]

A summary of the capital cost estimates is provided in the following table. This shows the original costs from the Options Appraisal Study, the current Stage 2 Cost Plan and the variance between the two, as described in the previous paragraphs.

Description	Options Appraisal (Option 4)	Stage 2 Cost Plan	Variance
Internal Works	[redacted]	[redacted]	[redacted]
External Works	[redacted]	[redacted]	[redacted]
Design Development / Construction Contingency	[redacted]	[redacted]	[redacted]
Building Cost Inflation	[redacted]	[redacted]	[redacted]
Professional Fees including Main Contractor’s Design Fees	[redacted]	[redacted]	[redacted]
Sub Total	[redacted]	[redacted]	[redacted]
Fixtures, Fittings and Equipment (Sports)	[redacted]	[redacted]	[redacted]
Clip n Climb Equipment	[redacted]	[redacted]	[redacted]
Total Capital Cost	[redacted]	[redacted]	[redacted]
Additional Options			
Extra over for green roof – say 50% of roof area	-	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]
Gross Internal Floor Area	**5,218m²**	**5,548m²**	**330m²**
Build Cost Rate per m²	[redacted]	[redacted]	[redacted]

Revenue Projections and Business Case

INTRODUCTION

A financial business case has been completed, based on the schedule of areas and design contained within this report. The purpose of the business case is:

- To confirm the revenue position of the existing Dover Leisure Centre
- To provide detailed 10-year income and expenditure projections for the operation of the new Dover Leisure Centre
- To define the known and potential capital funding for the project
- To assess the affordability of the project
- To provide conclusions and advise on business case related issues as the project develops.

The following pages contain a summary of the findings from the business case work. Further detail is contained in Appendix 8.

CURRENT REVENUE PERFORMANCE AND THROUGHPUT

The existing Dover Leisure Centre contains the activity areas listed in the following table, as well as a range of ancillary accommodation including staff areas, changing rooms, storage, plant and circulation.

Area	Description
Main pool	6-Lane 25m x 12.5m Swimming pool
Spectator seating	140 person capacity tiered seating
Learner pool	12.5m x 7.5m Learner pool
Sports hall	8 courts
Health and fitness	37 stations
Multi activity studio	1 x studios
Squash court	3 x courts
Small sauna and steam room	Included

It is important to compare the estimated revenue performance of the new centre with the current performance of the existing centre, or 'Base' position, particularly as the projections are used to calculate the amount of borrowing that can be funded. Historic revenue and usage figures were supplied by Dover District Council and the Operator (Your Leisure).

The past 3 years income and expenditure accounts for Dover Leisure Centre have been reviewed. These are summarised in the following table. They show that an annual grant of £265,000 is paid to Your Leisure to support the operation of Dover Leisure Centre and Tides Leisure Centre and to help deliver strategic objectives linked to the funding agreement with the operator.

The £265,000 payment is apportioned equally between Dover Leisure Centre and Tides. Therefore, the cost to the Council for subsidising Dover Leisure centre is £132,500. In addition, other revenue and repair and maintenance costs were covered by the Council, at a total cost of circa £150,000 in 2014/15.
It should be noted that these figures exclude depreciation and internal recharges.

Income*	2012-13	2013-14	2014-15
Dry side	[redacted]	[redacted]	[redacted]
Health & Fitness			
Wetside			
Rentals			
Secondary			
Other			
Total Income			

Expenditure	2012-13	2013-14	2014-15
Staffing	[redacted]	[redacted]	[redacted]
Premises			
Management			
Food and beverage cost of sales			
Central costs			
Total Expenditure			

Net Revenue*			
Deficit	[redacted]		
*excludes annual grant	[redacted]		

DDC Expenditure	2012-13	2013-14	2014-15
Total Revenue Costs*	[redacted]		
Capital Works			
Total Expenditure			

*Revenue costs include £132,500 revenue grant for DLC and expenditure by the Council on repairs and maintenance elements for which it retains liability.

10-YEAR REVENUE PROJECTIONS

Detailed revenue projections have been completed for the new leisure centre options. The projections have been checked against The Sports Consultancy's Operational Benchmark Database. This contains over 900 records of financial and throughput information from operational leisure facilities across the United Kingdom. As such, it is a 'high-level' model which depends on results from other, similar facilities, rather than specific programmes of usage and local pricing.

The database generates a range of benchmark levels (e.g. mean, upper quartile, lower quartile) and in choosing the benchmarks to use, it is important to consider the specific local context and current facility performance. For this study we applied the upper quartile data, as this will be a new facility in an area with significant existing and potential demand.

We have also considered the projected swimming revenue contained in Sport England's guidance for the development of affordable leisure centres which was developed in close consultation with the Amateur Swimming Association.

The following approach was adopted for selecting the benchmarks:

- **Income** - this took into account the performance of the existing swimming pools, the fact that the new centre will be designed to a higher specification than is currently the case and the need for the business plan to be relatively prudent
- **Expenditure** - this took into account the fact that the facilities will be new and more efficient than the existing one
- **Throughput** - this took into account the throughput levels at the existing Centre and the likely increase due to the opening of a new facility.

The operational revenue analysis includes a number of key expenditure areas, which are listed below:

- **Staffing costs** - based on a bespoke staffing structure and costs for similar facilities
- **Utilities** – costs are based on benchmark rates for similar new facilities
- **Repairs and maintenance** - based on benchmark rates for similar facilities
- **Cleaning** - based on benchmark rates for similar facilities
- **Insurances** - based on benchmark rates for similar facilities
- **Cost of sales** - based on benchmark rates for similar facilities
- **Operator profit** - at 4% of income
- **Overheads and central costs** - at 4% of income
- **National Non-Domestics Rates** - Assumed 80% rate relief.
- **Health and fitness membership** - A latent demand report was commissioned to provide an accurate assessment of the likely health and fitness membership numbers based on specific sites. The report concluded that total health and fitness membership of c.3,100 should be achieved. We have forecast growth in membership, up to this level, over a 5 year period. However, with good management and marketing we would expect this target to be exceeded sooner than this
- **Health and fitness pricing** - Full price health and fitness membership is assumed at £32.5 per month.
- **Lifecycle costs** – It is important to consider the treatment of lifecycle costs, for the periodic refurbishment and replacement of facilities. Expenditure on lifecycle costs is important to ensure the facilities are kept in good condition and that income does not diminish over time, due to deteriorating facilities. A typical allowance equal to 1.5% of the build costs (excluding fees and contingencies) should be allowed for, on an annual basis. We have presented the revenue projections including and excluding lifecycle costs.

  The revenue projections 'excluding' lifecycle costs provide a like for like comparison with the existing revenue figures for Dover Leisure Centre, as the Council does not currently allow for lifecycle costs in the revenue budget. The revenue projections 'including' lifecycle costs show the impact on expected revenue performance if operators are required to include lifecycle costs in their operational revenue performance

The following summary table contains a comparison of the estimated revenue performance of the new centre (including and excluding lifecycle costs) with the existing centre. Detailed projections are contained in Appendix 8.

	Including Lifecycle Costs	Excluding Lifecycle Costs
Income	**10-year average**	**10-year average**
Dry side	£137,713	£137,713
Health & Fitness	£1,368,360	£1,368,360
Wetside	£752,095	£752,095
Other Memberships	£0	£0
Rentals	£100,037	£100,037
Secondary	£412,204	£412,204
Outdoor	£79,995	£79,995
Total Income	**£2,850,404**	**£2,850,404**
Expenditure	**10-year average**	**10-year average**
Staffing costs:	(£946,074)	(£946,074)
Premises costs:	(£655,750)	(£454,750)
Management costs:	(£375,834)	(£335,634)
Cost of sales:	(£185,492)	(£185,492)
Other costs:	(£228,032)	(£228,032)
Total expenditure	**(£2,391,182)**	**(£2,149,982)**
Net Revenue	**10-year average**	**10-year average**
Surplus / (Deficit)	**£459,221**	**£700,421**
Membership Numbers	**10-year average**	**10-year average**
Health and Fitness Membership	3,009	3,009
Throughput	**10-year average**	**10-year average**
Total Throughput	675,744	675,744
Comparison with existing centre revenue performance	**£609,314**	**£850,514**

The projections show that the new centre will operate at a revenue surplus of c.[redacted]per annum (including lifecycle costs) and c.[redacted] (excluding lifecycle costs), an improvement of between £[redacted]and £[redacted] compared to the current deficit of £150,000.

Based on the findings from the latent demand report, health and fitness membership numbers are forecast to increase from c.1300 to c.3,000 and annual visitor numbers are expected increase to c.675,000 per annum.

POTENTIAL FUNDING AND AFFORDABILITY

As part of the business case, The Sports Consultancy reviewed the potential funding sources for the project. This review was completed in close consultation with finance officers from the Council and built on the work completed previously during the Options Appraisal Study.

The findings, summarised in the following paragraphs, are intended to inform decision making by the Council, as to whether to proceed with the project. The findings will require further review and updating, if the project proceeds to the next stage of development, as they are based on a number of significant assumptions regarding design, capital costs, timeframe, potential to achieve planning consent, and the value of assets and receipts.

The review of funding considered the following:

- The funding requirements for the project
- The potential funding options available to the Council
- Conclusions and recommendations.

The following table contains a summary of the financial challenge facing the Council in delivering the project based on the figures contained in this report.

	Including Lifecycle Costs	Excluding Lifecycle Costs
Annual revenue income/(cost) to the Council	[redacted]	[redacted]
Improvement in revenue compared to current centre (2014-15)	[redacted]	[redacted]
Total capital cost	[redacted]	[redacted]
Sport England funding	[redacted]	[redacted]
Prudential borrowing potential*	[redacted]	[redacted]
Funding Deficit/Surplus	[redacted]	[redacted]
Potential Revenue Deficit/Surplus after funding repayments	[redacted]	[redacted]

*The principal source of funding is prudential borrowing. The amount of prudential borrowing available is based on an assumption of a 40 year loan @ 3.75%, on an annuity basis, costing £50k per £1m borrowed per year.

We have also included an assumption of capital funding from Sport England. Initial consultation with Sport England have indicated that a sum of between £1m and £1.5m could be available to the Council. At this stage we have assumed the lower amount.

As with most projects of this scale and nature, the proposed funding structure is based on a combination of funding sources. The table shows that the estimated funding gap is between c[redacted] (including lifecycle costs) and c[redacted] (excluding lifecycle costs).

The funding gap will need to be closed if the new centre is to be developed. Options for raising the additional funding should be considered by the Council.

SENSITIVITY ANALYSIS

The revenue projections completed to date are based on best estimates, using the information available to The Sports Consultancy. However, it is recognised that there is scope for variations in the final revenue figures, as the project moves forward to operator procurement. Therefore, a sensitivity analysis has been conducted in relation to the revenue performance and the impact this would have on the Council's ability to finance prudential borrowing towards the project.

Using the initial revenue projections as the 'Base' case, a number of scenarios have been tested with changes in income and expenditure of + or - 8%. The results of the sensitivity analysis are included in Appendix 9 and summarised in the following tables. These show that changes in the revenue performance will have a significant impact on the borrowing potential and therefore the affordability of the project. It is important to ensure that the net revenue improvement from the new centre is maximised through conducting a competitive operator procurement process. Only when financial offers are received from operators will the final position be clear.

Sensitivity Analysis Including Lifecycle Costs

Scenario	Net Revenue	Potential Borrowing	
Base	[redacted]	[redacted]	
Higher income & base costs	[redacted]	[redacted]	
Higher income & higher costs	[redacted]	[redacted]	
Higher income & lower costs	[redacted]	[redacted]	Best case
Base income & lower costs	[redacted]	[redacted]	
Base income & higer costs	[redacted]	[redacted]	
Lower income & higher costs	[redacted]	[redacted]	Worst case
Lower income & Lower costs	[redacted]	[redacted]	

Sensitivity Analysis Excluding Lifecycle Costs

Scenario	Net Revenue	Potential Borrowing	
Base	[redacted]	[redacted]	
Higher income & base costs	[redacted]	[redacted]	
Higher income & higher costs	[redacted]	[redacted]	
Higher income & lower costs	[redacted]	[redacted]	Best case
Base income & lower costs	[redacted]	[redacted]	
Base income & higer costs	[redacted]	[redacted]	
Lower income & higher costs	[redacted]	[redacted]	Worst case
Lower income & Lower costs	[redacted]	[redacted]	

Project Programme

INTRODUCTION

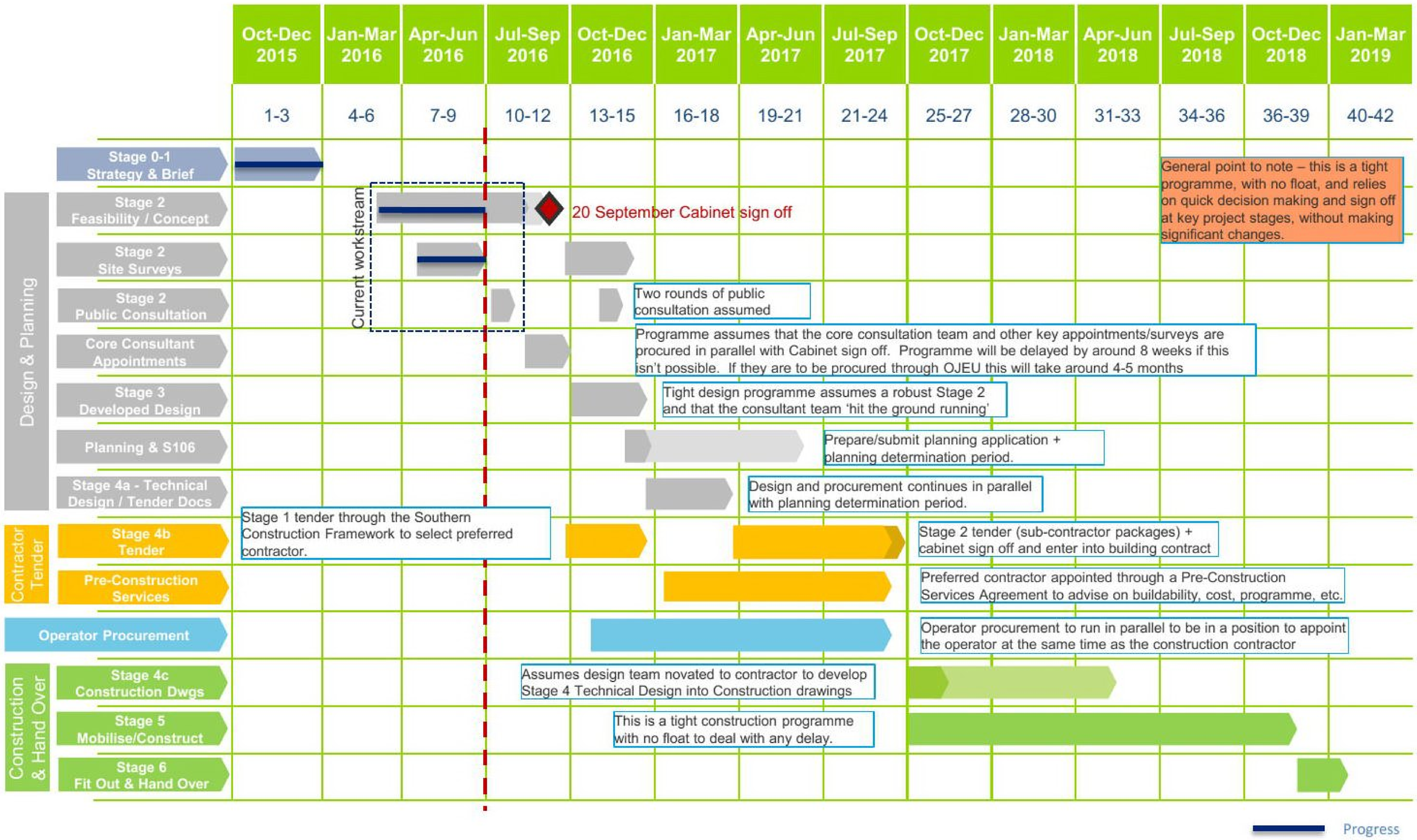
We have prepared a detailed target programme, which shows that the centre could be open by early 2019, and a copy of this is included in Appendix 10. A high-level summary of the target programme is also shown on the following page.

This is a tight programme, with no float, and relies on quick decision making and sign off at key project stages, without making significant changes. This should therefore be seen as a target programme and the Council should allow some programme contingency when reporting dates publicly.

The programme is also based on the following assumptions:

- Cabinet approval is received on 20 September 2016 to proceed with the project in accordance with the Stage 2 Feasibility Study.
- A 'two stage develop and construct' procurement route is adopted for the construction contract, and the preferred contractor is appointed as early as possible in Stage 3 through a Pre-Construction Services Agreement (PCSA) to work closely with the consultant team.
- The Southern Construction Framework is used to procure the construction contractor.
- The Leisure Management Contract for the new centre is procured in parallel with the design and procurement of the construction contractor, such that the financial position of both can be report to the same Cabinet meeting for approval.
- The core consultant team, including the project manager, architect, civil/structural engineer, services engineer, cost consultant and principal designer (CDM regulations), and other key consultants, such as the business planner, planning consultant, landscape architect and pool consultant, are procured so they are ready to commence work on Stage 3 upon Cabinet approval.
- Critical surveys, including ground investigations and ecological surveys are carried out prior to the 5 September Cabinet meeting.
- The consultant team 'hits the ground running' and doesn't have to revisit the Stage 2 design work.
- Completion of key stages are linked to planned Cabinet dates.
- Design is progressed in parallel with the determination of the planning application.
- The design is progressed to an early Stage 4 (previously referred to as Stage E).
- The design team is 'novated' to the construction contractor to complete the Stage 4 construction drawings.
- The contractor can deliver to the tight construction programme. Initial discussions with contractors suggest some nervousness with this and this should be tested further through the first stage procurement of the preferred contractor.

Project Programme



The Sports Consultancy Hadron Consulting GT3 Architects engenuiti Faithful+Gould BDP. dha planning

Risk Analysis

Risk Analysis

INTRODUCTION

An initial Risk Register has been prepared and is included in Appendix 11. An extract from the risk register showing the highest project risks is included on opposite. This identifies risks and states the probability of occurrence, the likely extent of impact on cost or programme, and the owner (the entity best placed to manage each risk). The risk register also outlines where risks have been or can be mitigated in the future, to reduce the Council's exposure.

The initial register has been prepared based on our understanding of the critical objectives for the project. The ratings have also been informed by survey work carried out during the feasibility stage and the way the design has been developed. Where further surveys should be undertaken to establish or mitigate risk this is also identified.

You will note that the Council are currently allocated the ownership of all of the risks. This will change as consultants and the contractor are appointed and other key stakeholders become involved in the project.

The risk register should be used in future phases to identify risks to enable the risk to be managed by the risk owner, mitigated and transferred to the contractor wherever possible. Due to the nature of some risks and the cost premium to transfer the risk to the contractor, some risks will need to be retained and managed by the Council.

The risk register should be updated regularly as the design development progresses, during tender stage and post-contract during the construction phase.

		Assessment of Risk		
Risk Area	Risk Description	Impact (1 - 5)	Likelihood (1 - 5)	Score
Site Ownership	Delay / unable to purchase the site.	5	5	25
Utilities	Insufficient water supply capacity to serve the proposed development. Increased cost and programme delay. Payment required for offsite works.	5	5	25
Cost	Land purchase is more than anticipated and/or makes the project unaffordable.	5	4	20
Finance/Funding	Sport England funding not obtained.	5	4	20
Planning	Planning application is rejected or consent is delayed. (See also other planning risks, which could have an imact on this, and the proposed mitigation measures)	5	4	20
Planning	S106 Agreement/Developer Contribution required for offsite highway improvements or contribution to Bus Rapid Transit	4	5	20
Programme	Construction programme is insufficient.	4	5	20
Site	Poor ground conditions.	5	4	20
Utilities	Insufficient electrical supply and/or nothing local to the site.	5	4	20
Site Ownership	Delay / unable to purchase the site.	5	5	25
Utilities	Insufficient water supply capacity to serve the proposed development. Increased cost and programme delay. Payment required for offsite works.	5	5	25
Cost	Land purchase is more than anticipated and/or makes the project unaffordable.	5	4	20
Finance/Funding	Sport England funding not obtained.	5	4	20

Procurement

INTRODUCTION

The options for the procurement of the Operator and the Main Contractor, have been considered. This section contains a summary of the options considered and the recommendations. Appendix 12 contains a detailed report on the contractor procurement options.

PROCUREMENT REQUIREMENTS

A structured and systematic approach is required in order to select the most suitable option for the project. The client's project objectives, especially in terms of cost, time, quality, risk and control must be clearly defined and the above options are reviewed against these to determine the most appropriate form of procurement for this project.

The broad purpose of contract procurement is to appoint an appropriately skilled contractor and/or operator, with the right team, agreed costs, programme and appropriate transfer of risk. This simple objective has become more difficult to achieve as project programmes are condensed, and both clients and contractors/operators seek to protect their position with regard to apportionment of risk.

MARKET CONTEXT

The construction market contracted during the recession and is struggling to cope with the increase in construction projects coming to the market. Contractors are therefore being more selective about the projects they bid for and will often only tender for those projects where their bid costs are kept to a minimum. The location of the project also reduces the number of contractors with the capability and experience to do this type of project.

COUNCIL PRIORITIES

When considering the procurement route, the following key considerations should be looked at, as they will directly influence the procurement route adopted.

The following priorities were established during the Procurement Workshop, and the proposed way forward reflects these priorities.

- Programme – Whilst the Council would like the centre to be open as soon as possible, programme is not the key driver.
- Cost certainty – A fixed price needs to be obtained for both the operator and construction contract before works start on site.
- Risk transfer - Risk should be transferred to the contractor and operator where appropriate.
- High quality – This is a high priority, however this must be balanced against obtaining cost certainty and risk transfer where appropriate. It will therefore be important to ensure the design is developed to a reasonably high level of detail to protect the design intent.
- Compliant with Public Contract Regulations – e.g. OJEU compliant.

PROCUREMENT OPTIONS

This report sets out the options available for the procurement of the operator and contractor for the Dover Leisure Centre. The options considered are:

Operator

- Design & Build contract and separate leisure management contract.
- Design, Build, Operate and Maintain (DBOM).
- Design, Build, Finance, Operate and Maintain (DBFO).
- Asset transfer/long lease.

Contractor

Procurement Routes:

- Traditional.
- Management Contracting & Construction Management.
- Partnering.
- Design and Build.

Procurement Options:

- Single stage.
- Two stage.

Commercial approaches:

- Fixed price (lump sum).
- Guaranteed maximum price.
- Target cost.

OJEU Compliant Procurement:

- A framework.
- Use the OJEU procedure.

PROCUREMENT WORKSHOP

A Procurement Workshop was held on 28 April 2016 with Council officers and members of the Consultant Team. Soft market testing has also been carried out with key operators and contractors on the proposed contractor framework, which supports the recommended way forward.

The following topics were reviewed as part of the Procurement Workshop:

- Procurement options/routes, including:
  - Separate construction contract and leisure management contract
  - Design, Build, Operate and Maintain (DBOM)
  - Design, Build, Finance, Operate and Maintain (DBFO)
  - Asset transfer/long lease.
- Summary of current operator market
- Why test the market?
- Timescales for procurement and when best to appoint the operator
- Operator input to design and final specification
- Funding from operators
- Key contract terms and considerations:
  - Length of contract (co-termination)
  - How to maximise interest from contractors
  - Maintenance responsibilities
  - Management fee arrangements.
- Soft market testing.

Procurement

OVERALL PROCUREMENT RECOMMENDATIONS

To summarise, we consider the following to be the most appropriate procurement approach.

Approach	Rationale
Contractor and operators to be procured separately. This will discount a DBOM, DBFO and Asset Transfer approach.	• To maximise competition and meet the project programme.
A two stage develop and construct procurement route to be adopted.	• Programme – to achieve completion by the end of 2018. • Early contractor involvement. • More attractive in the current tender market. • Collaboration with contractor to obtain high quality product. • Risk transfer where appropriate.
Design developed to Stage 4 (previously Stage E) in conjunction with the contractor and for the completion of the second stage tender.	• Ensure a high quality product is obtained. • To enable a fixed price to be obtained for the works on completion of the second stage tender.
A fixed lump sum price is obtained for the works.	• Obtain cost certainty before starting on site. • Risk transfer where appropriate.
Key designers, e.g. architect and civil/structural engineer would be appointed by/novated to the contractor to complete the design.	• Continuity of design. • Programme – to avoid downtime whilst a new team get up to speed. • Obtain a high quality product. • Transfer design risk to the contractor.
The contractor is procured through the Southern Construction Framework.	• OJEU compliant. • Avoids full OJEU process and associated programme impact. • Mini-competition to select contractor. • National contractors with relevant experience on the framework. • Bring on board a contractor at an early stage to work with the Council and the Design Team, and advise on, programme, buildability, cost, etc.

CONTRACTOR SOFT MARKET TESTING

In June 2016 we conducted soft market testing with the contractors on the Southern Contractors framework to establish the level of interest in the project.

A background document was issued to the contractors via the framework manager to provide an overview of the project. This included the following project information:

- Overview of work completed to date
- Proposed facility mix
- Estimated capital costs
- Initial floor plans designs and area schedule
- Procurement route
- Indicative programme.

Summary of Findings

[redacted] The results support the recommendation to use the Southern Construction Framework.

OPERATOR PROCUREMENT RECOMMENDATION

We have not included a full operator procurement review in this report, due to the commercial sensitivities, and further discussion required to conclude this.

It was however agreed that the leisure management contract and construction contract should be procured separately. It was also agreed that the procurement of the leisure management contract should be progressed in parallel with the construction contract so that the commercial position for the operator is known before entering into the construction contract.

OPERATOR SOFT MARKET TESTING

Nine operators where engaged with during the soft market testing exercise, to seek their views on the proposed plans for the new Dover Leisure Centre and to gauge interest in outsourcing of its management alongside that of Tides Leisure Centre in Deal.

Summary of Findings

All 9 operators responded in full to the soft market testing, indicating a high level of interest from the market. Questions included a range of topics focussing on the proposed facility mix and preferences concerning the details of the potential management contract. The purpose of the soft market testing exercise was to inform the development of plans for the new Dover Leisure Centre and decisions on the future management of it. A summary of the main findings is provided below:

- 8 out of 9 respondents expressed an interest in tendering for the contract to manage the new Dover Leisure Centre.
- There is strong support for combining the management of the new Dover Leisure Centre and Tides.
- The responses suggest that the minimum length of contract should be 10 years and that anything over 15 years in total may be less attractive.
- The majority of operators stated that they would be able to provide between £1-5m worth of finances if the Council required investment at either centre. Three operators could provide £5-10m.
- A number of refinements to the facility mix were suggested but these varied between operators.
- Consideration should be given to providing additional car parking capacity at the site, over and above the planned 250 spaces, a higher capacity was recommended by most respondents, up to 400 spaces.
- Additional comments received expressed respondents keen interest in the project and willingness to engage further with the Council as the project moves forward.

Overall, operators are supportive of the proposals and there is clearly significant interest in the management contract opportunity encompassing Tides and Dover Leisure Centre. This should help ensure a competitive tendering process to maximise the financial offer from potential operators.

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Consultation Results

Consultation

Following completion of the draft report the Council undertook a wide ranging consultation exercise. The purpose of this was to share the findings of the work to date and to invite comments from a broad range of stakeholder groups and the community of the District. The aim was to maximise engagement and to encourage groups and individuals to respond to the consultation questionnaire.

The following groups were identified to be included in the consultation process:

- Leisure centre users (existing and potential)
- Your Leisure and potential new operators
- Sport England & other National Governing Bodies of Sport
- Local sports clubs and community groups
- Protected characteristic groups
- General public
- Elected members
- Local media.

The following stakeholders were a specific target for consultation:

- Sport England
- National sports governing bodies (e.g. ASA)
- Project Advisory Group
- Kent County Council
- South Kent Coast Clinical Commissioning Group
- Kent Sport and sports networks
- Local primary and secondary schools
- Dover Association for Disabled People
- Town and Parish Councils.

The key messages promoted during consultation were:

- The Council wants people to have access to first class sport and leisure facilities to help them lead healthier lifestyles, realise their sporting ambitions, or simply have fun keeping fit.
- The Council is committed to working with the local community and sports governing bodies to build a new leisure centre fit for the 21st century.
- Decisions on a new leisure centre will be evidence based, meet local needs and be sustainable and financially viable.

The following communications channels were used for the consultation process:

- **Website content**
  The Council website was used as the primary source of information on the proposed new Dover Leisure Centre. The content was updated with regular information on project phasing and progress. All materials relating to the public consultation were published on the website, along with a link to an online survey. Content was designed to be engaging, easy to read, and included strong visuals. Links were provided to relevant documents such as the Indoor Sports Facility Strategy.

  A new web page on the proposed development of a new Dover Leisure Centre was created, and included details on the vision and initial scoping work on the project. A link to the summary findings from the Feasibility and Options Appraisal Study was also provided.

- **Social media (#NewLeisureCentre)**
  The use of social media is highly effective in delivering information in a timely manner about the development, and was particularly useful for encouraging interaction and linking to website content. The Council currently has over 11,800 'Friends' and 'Followers' across its social media platforms. This was used to provide information on the project and on the consultation process.

- **'A to Z' Leisure Facilities**
  The development of a new leisure centre for Dover and the consultation on the Indoor Sports Facility Strategy provided an opportunity to highlight the broad range of facilities accessible to people across the Dover district. As part of the communication plan, the Council developed an 'A to Z' of leisure facilities across the district. This was promoted through social media.

- **Keep Me Posted**
  A new topic for Dover Leisure Centre was created on Keep Me Posted. This service currently has over 36,900 subscribers and provides an opportunity to communicate directly with people who sign-up to receive email updates on the project. Updates were linked to website content.

- **Media Relations**
  The local media play a key role in people's awareness and perception of new developments in the district. Press releases were issued at key stages of the development process starting with the appointment of The Sports Consultancy for the detailed feasibility and design studies. Opportunities to involve the media were explored for the public consultation. Key messages, briefings, and Q&As for Officers and Members were developed to accompany the political and planning decision making process. As part of the soft market testing exercise, the Council also looked at opportunities for trade press coverage.

- **Public consultation**
  Engaging the local community in the decision making process will be a key factor in the successful delivery of the project.

  Public consultation should include an opportunity for the local community to be involved in reviewing options, and expressing opinions on locations and facility mix. There should be a range of opportunities for them to engage in the consultation, including events and online.

  Public consultation events included an event for key stakeholders at St Mary's Parish Hall in Dover, three drop-in sessions at the existing Dover Leisure Centre, along with a display of the proposals throughout the 6-week consultation period. A similar display was made available at the Dover Community Regatta event and a drop in session was held at Whitfield village hall. All attendees at the events were encouraged to respond to the online questionnaire.

RESULTS OF CONSULTATION

The Council conducted public and stakeholder consultation via a survey on their website in July 2016. A summary of the results are contained in Appendix 13 and summarised in the following paragraphs.

In total, 673 responses were received. The questions are outlined and results summarised below.

On average, how many times a month do you currently use Dover Leisure Centre?
- Approximately 38% of people never use the facility
- 31% use the leisure centre 1-5 times a month
- 14% 5-10 times a month
- 17% more than 10 times a month.

Do you support plans for a new Dover Leisure Centre?
- A significant majority, 89% of people, agreed with this statement. Only 11% disagreed.

Which facilities are most important to you?
- 83% of people cited a main swimming pool as one of the three most important facilities
- 42% included a health and fitness gym,
- 28% a learner pool
- 23% a sports hall
- 20% multi-purpose studios
- 18% a café
- 17% a sauna and steam room
- 9% 5-a-side football pitches
- 8% 'clip-and-climb'
- 6% a spin studio
- 6% also included squash courts in their three priority facilities.

Do you have a view on the proposed site at Whitfield?
- 69% of respondents support the proposed site
- 19% who oppose
- 12% who have no strong view.

How do you usually travel to the existing Dover Leisure Centre?
- 63%, travel by car or motorcycle
- 21% walk or run
- 8% use public transport
- 7% other
- 2% travel to the Leisure Centre by bike.

How would you most likely travel to the new leisure centre in Whitfield?
- 65% of respondents stated that they would travel by car or motorcycle to the Whitfield site
- 13% would use public transport
- 11% would walk or run
- 7% stated other
- 2% would use a bike.

If the Whitfield proposals go ahead, how often would you use the new leisure centre?
- 53%, would use the facility more regularly
- 27% about the same
- 11% less frequently
- 10% of respondents would never use the facility.

What do you like most about the plans for the new leisure centre?
- The proposed location and parking facilities are popular with many. The increased pool size is also highlighted as a positive, however around 10% would like it to be 50m. The range of facilities is another major theme, particularly mentioned were the clip-and-climb and fitness studios.

Is there anything that you would like to see changed to improve the plans for the new leisure centre?
- The main complaints are around the lack of a 50m pool and the size of the sports hall. The sports hall was mentioned by various users, including badminton payers and cheerleader.
- Location is also an issue; although many people approve of the new location, there were consistent concerns, primarily by those aged 65 and over, about the move away from Dover and lack of public transport links.
- The 'changing village' was also highlighted as a problem by some people.

VERBAL FEEDBACK FROM CONSULTATION EVENTS

In addition to the online questionnaire a series of stakeholders and public consultation events were held. These were attended by Council members, officers and representatives of the consultant team.

Stakeholder's workshop (7th July 2016)
- 29 people attended the event, representing 17 organisations within the local councils, schools and sports and civic societies. The proposed facility mix was discussed.
- Most delegates provided positive feedback, alongside some detailed suggestions regarding specific aspects of the proposals. For example, the representative from Kent Cricket was interested in the type of flooring in the main hall, table tennis club members provided information about the lighting levels required for their sport and Dover Dash were particularly interested in access to the pool for people with disabilities. Some attendees raised concerns; Whitfield Parish Council stated that more facilities should be provided, including a 50m pool, the Dover Society would prefer a town centre location. Vista twisters and Deal Gymnastics explained that their numbers are increasing and ideally are looking for stand-alone facilities.

Drop-in consultation (14, 16, 19, 23rd July 2016)

A stand was set up at the Dover Community Regatta which was well visited throughout the day.
- Verbal responses from the consultees were mixed: many were enthusiastic about the project but a substantial minority were unhappy that the proposed site is outside the town centre. This probably reflects the fact that many of the people who attended the regatta live in or near the town centre.
- Concerns were raised about the frequency and cost of public transport links from the town centre.
- There was widespread recognition that improvements in the provision of indoor sports are necessary and the proposed facility mix was generally supported.

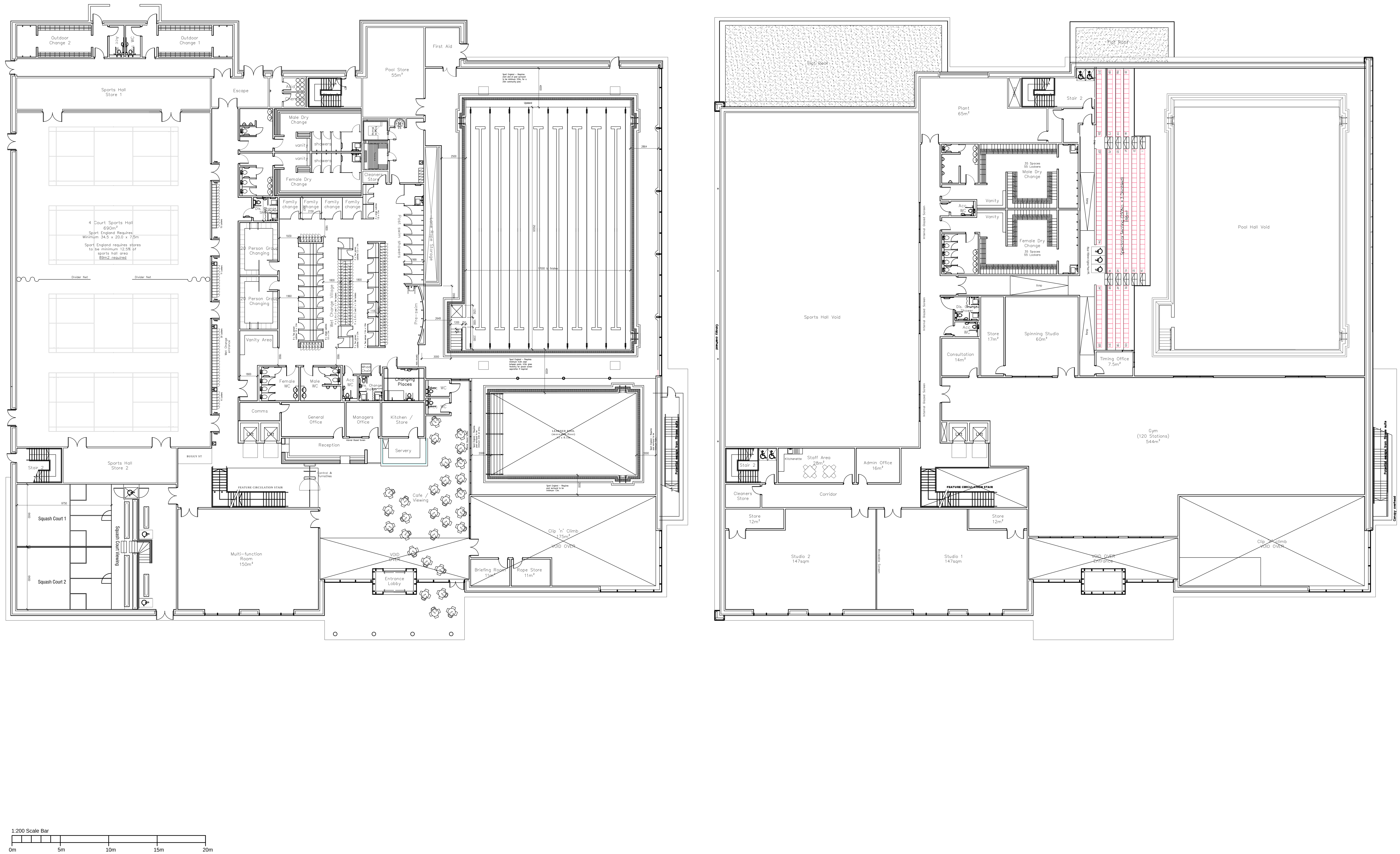
SUMMARY

The level of response to the consultation process was relatively high, at 673. The results generally demonstrate there is a good level of support for the proposals. There are some notable comments relating to the facility mix, location and accessibility, which should be considered further as the project develops.

Overall, the results of the consultation to date have been positive and will feed into the next stage of work, as designs are refined.

Appendices

Appendix 1 –Architectural Drawings



Rev	Description	Date	Drawn
D	Entrance, cafe, climbing wall amended following client comments	22.06.16	ces
C	Feature Stair and Outdoor change revised as per client comments	16.06.16	ces
B	Clip 'n' Climb included as part of overall development	13.06.16	ces
A	Size/location of Spa, Pool Store and First Aid amended	08.06.16	ces

FEASIBILITY

DOVER LEISURE CENTRE
WHITFIELD, DOVER

GROUND AND FIRST FLOOR
AS PROPOSED

JOB NO: 15042
DWG NO: (SK) 020
SCALE: 1:200 @ A1
DRAWN BY: ces
REV: D

DO NOT SCALE
ALL DIMENSIONS TO BE VERIFIED ON SITE

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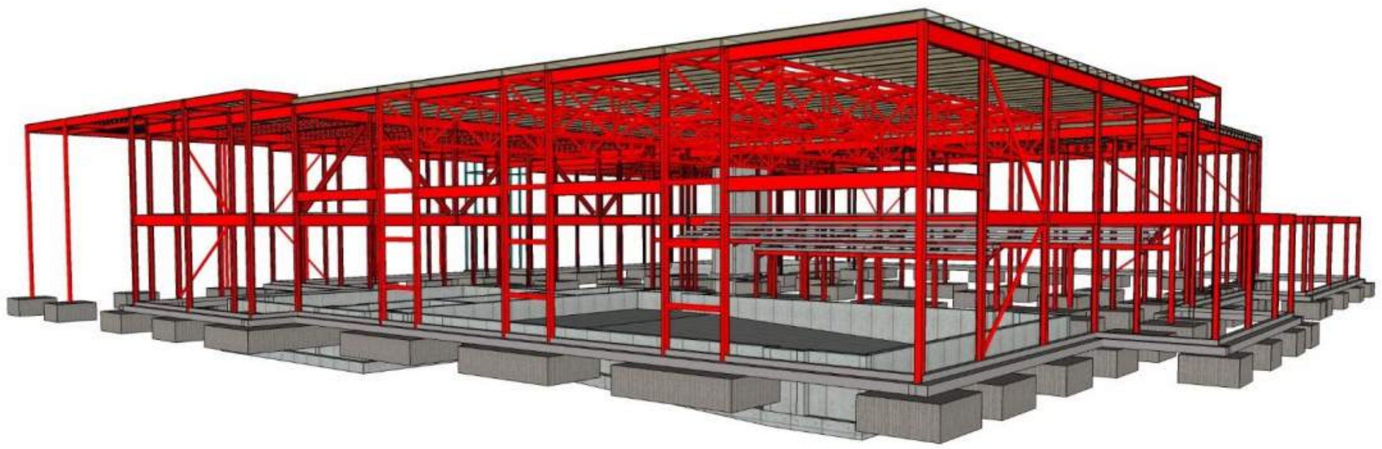
Appendix 2 – Civil and Structural Engineers Report

engenuiti



DOVER LEISURE CENTRE

STRUCTURAL & CIVIL ENGINEERING RIBA STAGE 2 REPORT

for

GT3 Architects

17th June 2016

634-S-REP-001
Rev 0

Engenuiti
2 Maltings Place
Tower Bridge Road
London, SE1 3JB

STRUCTURAL & CIVIL ENGINEERING RIBA STAGE 2 REPORT

CONTENTS

Revision History

Rev	Date	Purpose/Status	Document Ref.	Comments
00	24 June 2016	Draft	633-S-REP-001	Issued for Information

Prepared by:

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Reviewed & Approved by:

Paul Grimes
Director

1 EXECUTIVE SUMMARY

1.1.1 Engenuiti has been appointed by GT3 Architects to provide civil and structural engineering design services for the proposed new leisure centre for Dover.

1.1.2 The purpose of this Structural & Civil Engineering Feasibility RIBA Stage 2 Report is to describe the civil & structural engineering concept design of the proposed development to support the preliminary cost estimates for the project.

1.1.3 The proposed leisure centre is located in Whitfield, Dover. The site postcode is CT16 3FH. The site location is south of Honeywood Parkway and east of The Glenmore Centre.

1.1.4 The site is currently a greenfield location bounded by Honeywood Parkway and a spur road to the east of the site.

1.1.5 The proposed leisure centre is a new build facility. The new facility will be designed around the following accommodation mix:

- 8 lane 25m pool
- Learner pool with moveable floor
- Wet changing village
- Activity zone around a new café space
- 4 court sports hall with associated changing
- Treatment rooms
- Gymnasium
- 2 large dance studios
- Spinning studio.

1.1.6 The proposed building superstructure can be conceptually split into four key components as follows:

- Long-span roof structures over swimming pools, sports hall and studios (column free areas)
- Floor slabs to studio and office spaces supported on an regular grid of vertical support
- Secondary structure to façade and building envelope
- Swimming Pool structures

1.1.7 Several structural framing solutions can be applied to the proposed architectural form. The long span roofs can be framed using cellular steel beams, steel trusses or glulaminated timber beams or trusses. The floor slabs to studio and office areas can be frames using steel columns and beams with composite reinforced concrete slabs cast on metal deck or using precast concrete soffit panel systems. Cross Laminated Timber (CLT) floor options are also possible.

1.1.8 Secondary structural framing to building envelope can be through the use of metal decks, timber cassettes, composite panel systems, concrete block walls, cold formed steel backing systems and CLT panels.

1.1.9 The swimming pool structure can be constructed out of in situ reinforced concrete, stainless steel systems or sprayed concrete.

1.1.10 The British Geological Survey (BGS) online map indicates that the sites bedrock geology is Margate Chalk Member. The sites superficial deposits are of Clay with flints formation, consisting of clay, silt sand and gravel.

1.1.11 Based on the desktop study of the local geology and borehole data available on the BGS website we suggest that the proposed structure and ground conditions may be suitable for shallow pads and ground bearing slabs founded on the chalk.

1.1.12 Our experience of leisure centre construction suggests that shallow foundations and a ground bearing pool structure are the most favoured starting point from a cost perspective but that allowance should be made for a piled foundation solution until further ground information is available.

1.1.13 Applications and consultation will be required to Southern to agree a method of discharge and flow rate from the swimming pools. Additional applications will be required to Southern Water if connecting to the public sewer network and also to the Environment Agency if the final proposal incorporates discharge to ground.

1.1.14 As the development is considered "Major", the Local Lead Flood Authority: Kent County Council SuDS pro-forma will need to be completed as part of the planning application process.

1.1.15 We will investigate the feasibility of discharging surface water to ground through a soakaway, incorporating results from infiltration testing. Additional SuDS measures will also be studied and considered further at the next design stage.

1.1.16 At this stage we suggest using a baseline structural option of a steel frame with long span truss over the swimming pool and long span cell beam roof, shallow RC foundations and in situ RC swimming pool. We have progressed the cladding design using a timber cassette envelope solution.

2 INTRODUCTION

2.1 General

2.1.1 Engenuiti has been appointed by GT3 Architects to provide civil and structural engineering design services for the proposed new leisure centre for Dover District Council.

2.1.2 The purpose of this Structural & Civil Engineering Feasibility RIBA Stage 2 Report is to describe the civil & structural engineering concept design of the proposed development to support the preliminary cost estimates for the project.

2.1.3 This report has been produced for the exclusive use of GT3 Architects and should not be used in whole or in part by any third parties without the express permission of Engenuiti in writing.

2.1.4 This report should not be relied upon exclusively for decision making purposes and should be read in conjunction with other documents and drawings produced by the design team.

2.2 Proposed Development

2.2.1 The proposed leisure centre is located in Dover, Kent. The site location is near the Whitfield Interchange just south of the main A2 road and is bounded by Honeywood Parkway.

2.2.2 The site is currently a greenfield location bounded by Honeywood Parkway and a spur road to the east of the site.

2.2.3 The proposed leisure centre is a new build facility. The new facility will be designed around the following accommodation mix:

- 8 lane 25m pool
- Learner pool with moveable floor
- Wet changing village
- Activity zone around a new café space
- 4 court sports hall with associated changing
- Treatment rooms
- Gymnasium
- 2 large dance studios
- Spinning studio.

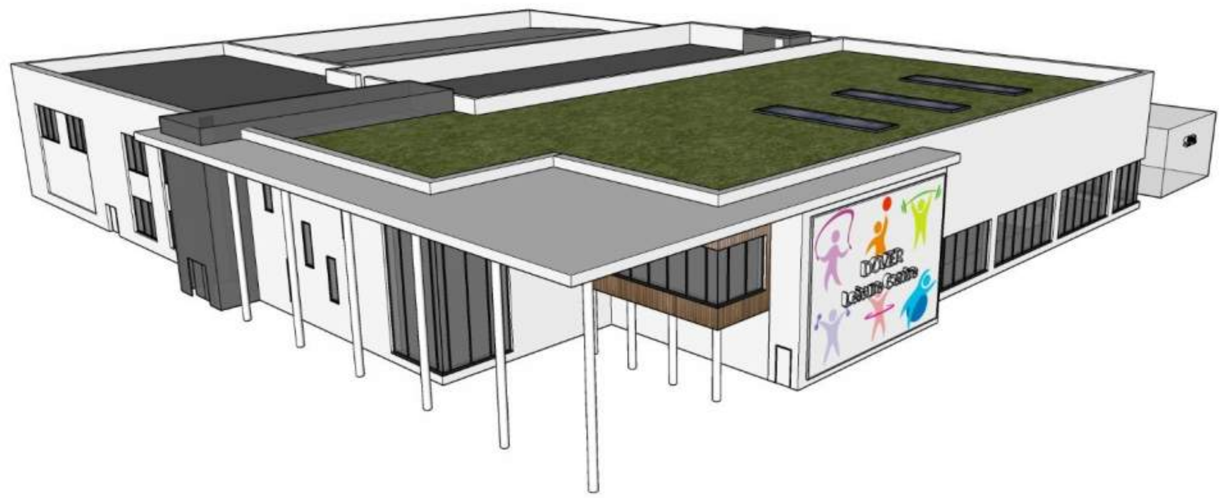


Figure 2.1: Architectural Concept Design Proposal View 1

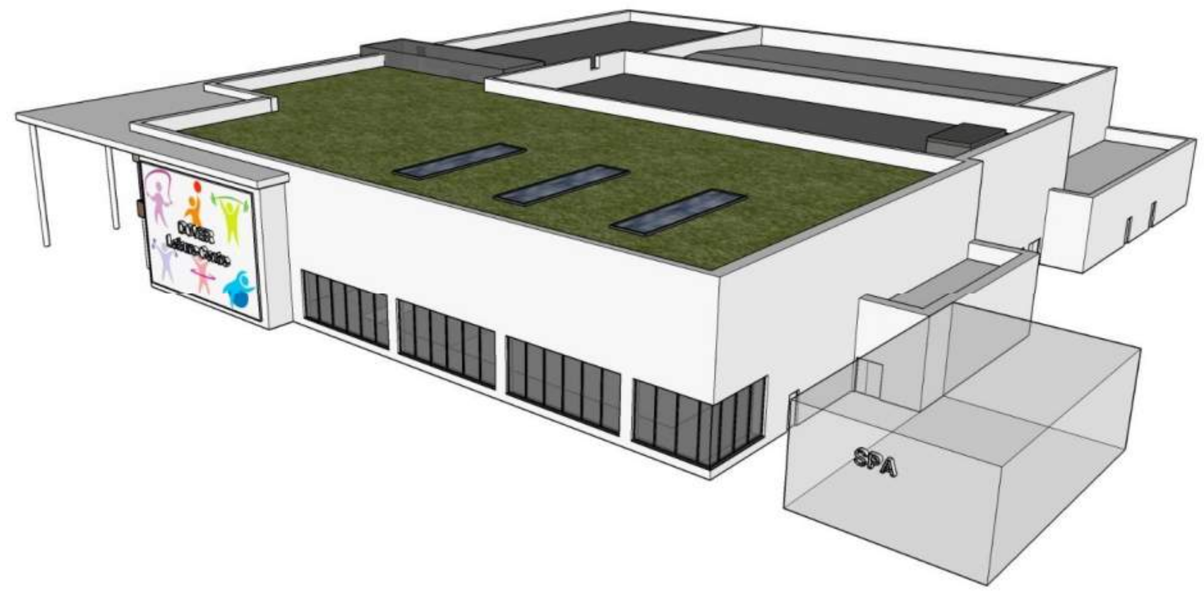


Figure 2.2: Architectural Concept Design Proposal View 2

3 DESIGN BRIEF & STRUCTURAL FRAMING OPTIONS

3.1 Development of Key Structural Design Criteria

3.1.1 From an understanding of the Architect's (GT3 Architects) aspirations a list of key structural questions have been developed as shown in Table 3.1 below.

Driver	Comments
Aesthetics	Long span roof structures above the Swimming Pool and Sports Hall are to designed and detailed to high aesthetic standards. Steel and Timber options to be considered.
	Sports Hall and gymnasia roof soffits to be expressed and provide acoustic performance. Swimming pool roof to feature timber ceiling cassette roof, acoustic metal deck or similar.
	Façade Glazing – standard high quality system for clear edges to swimming pool hall.
Cost	Lowest cost for required quality.
Flexibility	Administration and studio spaces to be flexible for future configurations, consider structural grids to minimise layout impact.
	Imposed load for general areas 4 kN/m^2 (3+1), with studio and gymnasia spaces designed as 5 kN/m^2.
	Fabricated steel sections with 300 / 350mm dia. openings are provided in central change and entrance areas at high-level ground floor and first floor for services distribution.
	Swimming Pool plant room located adjacent to pool hall building to avoid building a basement if possible.
Programme	Procurement route unknown at this stage
Restrictions	Early consultation with local specialists to ensure swimming pool tanks and roof structure options are detailed to most economic solutions.
	The studio and party room areas are required to achieve an 8.4Hz system frequency as these areas will be subject to rhythmic dance activities.
	Consideration of the chalk ground conditions
Sustainability	Sustainability should be an important consideration balanced with cost implications.

Table 3.1: Key Structural Questions

3.1.2 From these key design questions/criteria the primary structural requirements developed are:

- Cost is key to each design consideration – best cost for required quality.
- Aesthetics are very important especially with the desire to create an expressive and efficient long span roof structure. This spans approximately 28m in the swimming pool area.
- Sustainability design criteria are likely to be key, but subject to further development (including consideration of Capital Cost Vs Whole Life Cost Vs Low Carbon Design).

3.2 Structural Framing Concept

3.2.1 The proposed building superstructure can be conceptually split into four key components as follows:

- Long-span roof structures over swimming pools, sports hall and studios (column free areas).
- Floor slabs to studio and office spaces supported on a regular grid of vertical support.
- Secondary structure to façade and building envelope.
- Swimming Pool structures.

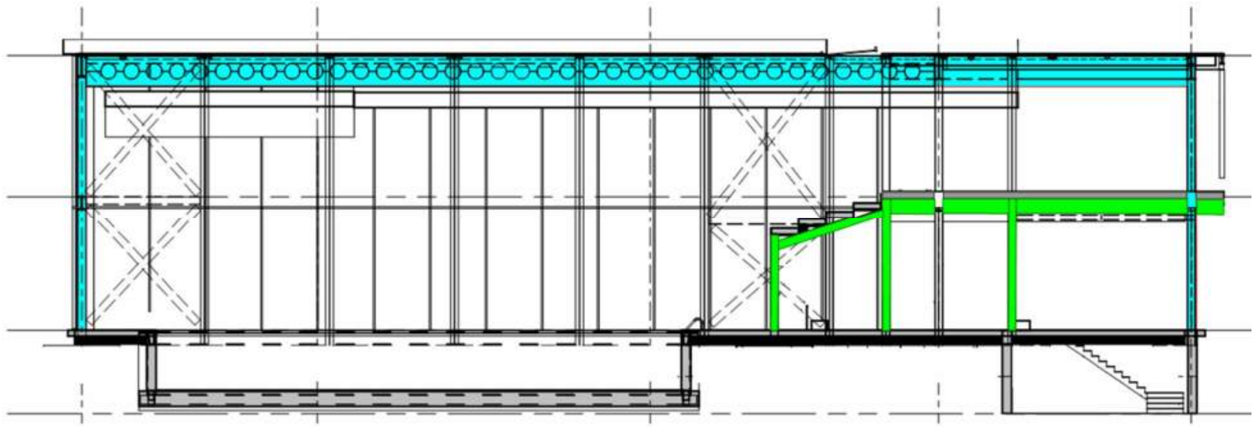


Figure 3.1: Structural Framing Concept – Long Span enclosure (blue) over traditional framed floor structures (green)

3.2.2 The sports hall and swimming pool are effectively covered with long-span structures (steel or timber).

3.2.3 The first floor deck (studios and offices) is generally supported by a regular grid of columns or walls (spanning to first floor only) allowing a wide variety of efficient floor structures to be considered in steel, concrete, timber, or hybrid combinations.

3.2.4 Column free areas beneath first floor slabs can be formed with additional transfer structures (steel or timber).

3.3 Long-Span Roof Structures

3.3.1 The architectural proposal for the sports hall and swimming pools suggests a flat roof with some allowance for roof lights. There are several structural options for framing these types of roofs but a driving factor will be an ambition to make the structure as economic as possible and to try to reduce the main span of the roof beams by adding intermediate columns on major wall lines.

3.3.2 Deep steel beams can be used to form the primary beams. These could be fabricated steel beams or beams with cellular openings. By increasing the depth of the steel beams, a lighter section can generally be used, though deeper beams may reduce natural daylighting to the areas below. Provision of beams with cellular openings provides an efficient primary support structure and allows services to pass through the cells of the beams.

3.3.3 Similar structural framing can be formed with fabricated steel trusses. These provide a lighter visual appearance (and generally require a lower tonnage of steel compared to solid beam sections, which can make this a cost-competitive option). Trusses can be delivered to site in sections with splices formed on site, to ease transportation difficulties. Services can more easily co-ordinated with the open structural form.

3.3.4 The use of glu-laminated solid timber beams over the swimming pool may be considered as it provides the major benefit of significantly reduced maintenance programme as timber does not require sacrificial protection against corrosion. This choice of structural material is also a major consideration in low carbon design. Glu-laminated beams would be designed on the basis that the moisture and temperature levels within the pool would be controlled ('service class 2'), to be discussed further with the design team.

3.3.5 The secondary roof structure spanning between the main roof beams can be provided in several ways including secondary steel purlins, metal deck cassettes, solid timber CLT roof panels and also timber roof cassettes.

3.3.6 A more detailed appraisal of some of the long-span roof options discussed above is found in Appendix C ('Long Span Roof Studies', June 2016)

Figure 3.2: Timber / Steel Long-Span Roof Options

3.4 Floor Decks and structural framing: Studios and Offices Studio Spaces

3.4.1 The first floor slabs (studios and offices) can be primarily framed in steel, in situ concrete or timber glu-laminated beams supported on steel or in situ concrete columns or timber (CLT walls).

3.4.2 Floor decks can be formed in in situ concrete (on falsework or steel decking), pre-cast concrete decks or solid timber (cross laminated timber structures) depending on function, durability issues, visual aspirations and cost.

3.4.3 Columns would be provided on an open grid to allow circulation around changing rooms, entrance halls etc. Closer column grids could provide a thinner and lighter overall structure, but would impact these areas and their future ability to be altered.

3.5 Steel Framed Floor Decks

3.5.1 A steel frame either with fabricated beams (with cellular openings or with services running under standard beams) is an economic framing solution for leisure centre structures as it has great flexibility for creating clear spans over secondary layouts such as changing areas and entrance foyers.

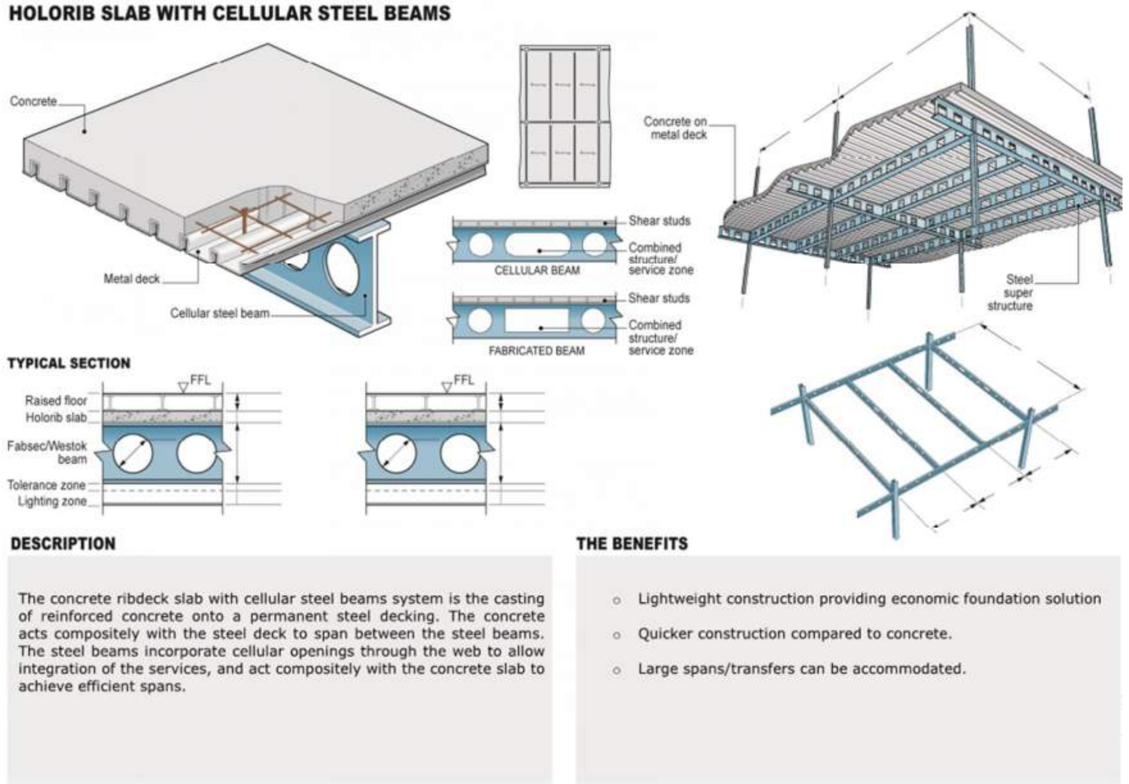


Figure 3.3: Structural Slab options – Composite concrete/steel decks on steel frame

3.5.2 The negative issues with steel frames and composite decks are primarily concerned with long-term corrosion protection in the "wet-areas" of the buildings.

3.5.3 In conjunction with a steel frame, a slab may be formed using either composite decking or pre-cast RC units (omnia deck) with a structural concrete topping. The corrosive atmosphere requires special measures to be taken where composite decks are used, where in situ concrete, omnia decks or timber panels would be best suited.

3.5.4 Composite decks sometimes require temporary propping during construction, which we would aim to avoid. This is feasible with a trapezoidal deck profile. Propped floor solutions are generally avoided due to the detrimental effect on construction programming.

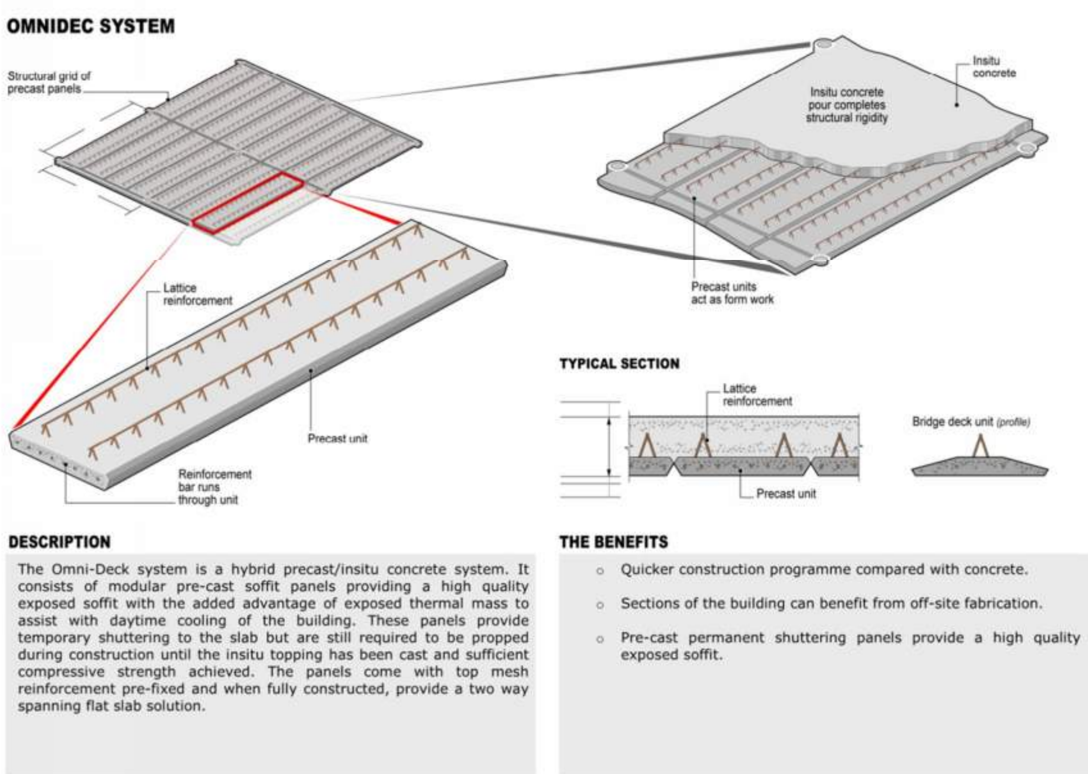


Figure 3.4: Structural Slab options –Omnia pre-cast concrete decks with structural topping (below)

3.5.5 Steel framed floor decks on a regular grid of columns will provide a fairly lightweight structure which is likely to suit a pad foundation strategy.

3.5.6 Column free areas can be easily formed by using deeper cellular beams or by forming upstand trusses connecting the first floor and roof steel beams.

3.6 In situ reinforced concrete frame with flat slabs

3.6.1 An in-situ reinforced concrete flat slab on in-situ columns typically has several advantages:

- i The damp and potentially corrosive atmosphere in the wet change area would result in expensive protection requirements to the steel. With a concrete flat slab the required protection can be achieved by increasing the cover to protect the reinforcement.
- ii The lack of downstand beams facilitates the distribution of services.
- iii The concrete will offer an improved vibration and acoustic performance below the fitness suite over and above a steel/concrete composite option.
- iv It offers the option of an exposed concrete slab over the reception area, with the associated exposed thermal mass to regulate heating and cooling.

3.6.2 An in situ concrete frame (flat slab construction) would be suitable for some areas of the first floor structure but the requirement for large column free areas could make this solution unfeasible over the training pool and atrium areas.

3.7 Hybrid Options

3.7.1 A variety of schemes can be offered which follow a hybrid approach to combine the advantages of each material. An example of this would be the use of CLT floor slabs and walls at first floor with additional steel beams and columns to provide additional rigidity and stability.

3.8 Disproportionate Collapse & Overall Stability

3.8.1 The structural building design will consider the requirements to prevent disproportionate collapse in accordance with the relevant guidance, either by the key element design method or by designing appropriate ties as necessary.

3.8.2 For steel framed structures (including composite steel/timber) braced bays could be used to provide stability. Where open facades are to be uninterrupted by vertical bracing, this could be replaced with moment frames and plan bracing (as detailed on the feasibility proposals). Omission of bracing would generally be considered a less economical solution, but has large advantages in terms of the architectural merit of the building and may also allow improved daylighting to certain spaces.

3.8.3 The use of RC walls and cores could also be considered as an alternative to some braced bays.

3.8.4 Global stability of the long-span roof structures needs to be considered carefully in the final detailing of the building.

4 SWIMMING POOL CONSTRUCTION OPTIONS

4.1 Swimming Pool Construction

4.1.1 The approach to the construction of the swimming pools is a key consideration in the design of any 'wet side' leisure centre. Likewise, careful consideration must be given to the implications of chlorinated pool water in selecting structural materials and protection systems for the pool hall structural framing. These issues are further discussed below.

4.2 Types of Swimming Pool Construction

4.2.1 The types of pool construction most likely to be suitable for a ground floor level pool in a leisure centre context are:

1(a) Shuttered in-situ reinforced concrete to BS 8007 / BS EN 1992, part 3.
This is reinforced concrete which is detailed so that it is capable of acting as a water-retaining structure. This detailing extends to the use of hydrophilic strips or waterbars at joints and the arrangement of reinforcement to restrict crack widths (usually to 0.2mm). A water resisting additive may also be employed in the concrete mix.

1(b) Sprayed concrete (shotcrete or gunite)
This is concrete which is applied pneumatically through the use of a pump or hose or nozzle. The wet concrete is sprayed over the reinforcement cage to form a continuous wall with minimal construction joints. Mixes with lower water content can be employed than is the case for conventional cast in-situ concrete, enabling the use of fewer joints.

2(a) Stainless steel side walls, with structural steel back framing, bolted down onto reinforced concrete slab and lined internally with PVC membrane. An example of this is the system supplied by *Myrtha*.

2(b) Stainless steel side walls and floors, with structural steel back framing and welded seams.

4.2.2 Other forms of pool construction which are unlikely to be appropriate in the leisure centre context include:

3 Concrete blockwork formwork filled with reinforced concrete
Used primarily for private and hotel pools. Robust detailing would depend on specialist input.

4 Reinforced concrete, not designed to BS 8007, but internally tanked
Not recommended due to potential risk of damage to internal membrane, e.g. via thermal shock

4.2.3 Options 1a, 1b, 2a, and 2b are compared in the following table. This table is derived from the 'Pool Tank Constructions' table provided in **Sport England; Swimming Pools Design Guidance Note; February 2011; revision 003**. Additional comments which do not derive from this reference document are provided in italics

	1a. Reinforced Concrete In-situ	**1b. Sprayed Concrete**	**2a. Stainless Steel Side Walls and PVC Liner**	**2b. Stainless Steel Walls and Floor with Welded Seams**
Structural	Monolithic design for whole of tank and pool surrounds when constructed from in-situ water retaining concrete to BS 8007 / BS EN 1992 Part 3 gives a highly stable structure.	Gunnite sprayed reinforced concrete. Usually with integrated transfer channel. Fixtures and fittings need to be integrated into the tank design. *Particularly efficient method for pools with curved and irregularly shaped edges. Requires an experienced subcontractor.*	Stainless steel side walls incorporating structural back framing fixed to a reinforced concrete floor.	Polished stainless steel side walls and floors incorporating structural back framing and welded seams. Stainless steel panels usually available up to depths not greater than 3m. Junction with pool surrounds and floor structure requires special care.
Waterproofing	Inherent if pool well constructed and detailed in accordance with BS 8007 / BS EN 1992 Part 3. Can be augmented by waterproof liner and/or render.	*Inherent if constructed correctly, and with the benefit that there are fewer joints (weak points) than is the case in a conventional cast in-situ walls.*	Typically factory applied PVC facing to wall panels and loose PVC floor liner with seas thermally welded.	*Inherent.* Bare polished stainless steel wall and floor panels with welded joints.
Finishes	Ceramic tiles on render backing recommended.	Ceramic tiles on render backing recommended.	PVC as described above. Can apply tile finishes on top.	No finish or ceramic tile options to upper wall sections subject to design and stiffening.
Robustness	Robust – minimal risk of damage from vandalism or pool hall activities. Durable. Stable construction. Workmanship critical.	Robust – minimal risk of damage from vandalism or pool hall activities. Durable. Stable construction. Workmanship critical.	PVC lining is liable to mechanical damage from sharp objects e.g. puncture resulting in leakage. Potential movement issues at junctions with loose linings and more rigid surrounds. Workmanship critical.	*Junctions between stainless steel tank and surround is obvious weak point. Workmanship critical.*
Service Life	Proven long service life. Examples c.100 years+.	*Method only in common usage since 2000, so extent of lifetime not yet proven, but would expect long lifetime if workmanship adequate.*	Periodic replacement of liners required (c.10 years). Oldest examples c.40 years.	Oldest examples c.40 years.
Maintenance	Minimal long term maintenance of structure. *Inspection and cleaning of grout anticipated on 5-7 year cycle.* Re-grouting of ceramic tiles may be required at c.20 year intervals. Life of finishes will depend on quality of materials, maintenance of pool water quality, wave action and chemicals utilised.	Minimal long term maintenance of structure. *Inspection and cleaning of grout anticipated on 5-7 year cycle.* Re-grouting of ceramic tiles may be required at c.20 year intervals. Life of finishes will depend on quality of materials, maintenance of pool water quality, wave action and chemicals utilised.	Regular inspection and quick repair of PVC liner damage required. Annual inspection of stainless steel structure to check for pitting/corrosion.	Annual inspection of stainless steel structure to check for pitting/corrosion.

Construction	Long construction period for concrete shell. Wet trade for pool finishes require an extensive period for application and curing. Lack of long term warranty.	extensive period for application and curing. Lack of long term warranty.	Lengthy off-site design and prefabrication time requires early placement of contract. Short installation period. Maximum warranty period 15 years. Reductions in programme time are possible compared with a concrete pool.	Lengthy off-site design and prefabrication time requires early placement of contract. Short installation period. Maximum warranty period 15 years. Reductions in programme time are possible compared with a concrete pool.
Quality Control	Resolution of severe defects and leakage can be complex requiring potential drainage of pool and resulting in extended closure. Dimensional control dependent on quality of workmanship on site.	Resolution of severe defects and leakage can be complex requiring potential drainage of pool and resulting in extended closure. Dimensional control dependent on quality of workmanship on site *(allow zone of finishes for tolerance).*	Resolution of severe defects and leakage can be complex requiring potential drainage of pool and resulting in extended closure. Dimensional control achieved through factory prefabrication and site control.	Resolution of severe defects and leakage can be complex requiring potential drainage of pool and resulting in extended closure. Dimensional control achieved through factory prefabrication and site control.
One stop shop for Responsibility	No	Not fully	Yes	Yes
Cost	Usually used as benchmark option for costing. Allowance needs to be made for cost of periodic closures for repairs to tiles and grouting (e.g. tile replacement from 25 years onwards).	Allowance needs to be made for cost of periodic closures for repairs to tiles and grouting (e.g. tile replacement from 25 years onwards).	Can be cheaper in terms of capital costs and short term expenditure. Allowance needs to be made for cost of periodic closures for repairs (e.g. replacement of lining from 10 years onwards).	*Usually expected to be more expensive up front than option 2a. No need for liner replacement but ultimate tank lifetime unproven.*

4.2.4 Reinforced concrete, cast in situ, remains the most common and tried-and-tested approach to the construction of leisure centre swimming pools. It relies on good workmanship that, if achieved, can result in durable tank structures with a surface which can be relatively easily finished. This remains the team's recommended starting point for leisure centre pool construction, and this will be the approach that is adopted as the design progresses unless obvious project specific factors act to drive the design strategy in another direction.

5 SITE CONDITIONS

5.1 Background

5.1.1 A preliminary desk- top study of the geology has been undertaken for the site based on historical and current topographic maps and British Geological Society borehole records.

5.1.2 A detailed site investigation including boreholes, in situ and laboratory geotechnical testing and testing for any potential ground contamination has not been undertaken at this stage.

5.2 Site Location & Existing Use

5.2.1 The proposed leisure centre is located in Dover, Kent. The site location is near the Whitfield Interchange just south of the main A2 road and is bounded by Honeywood Parkway.

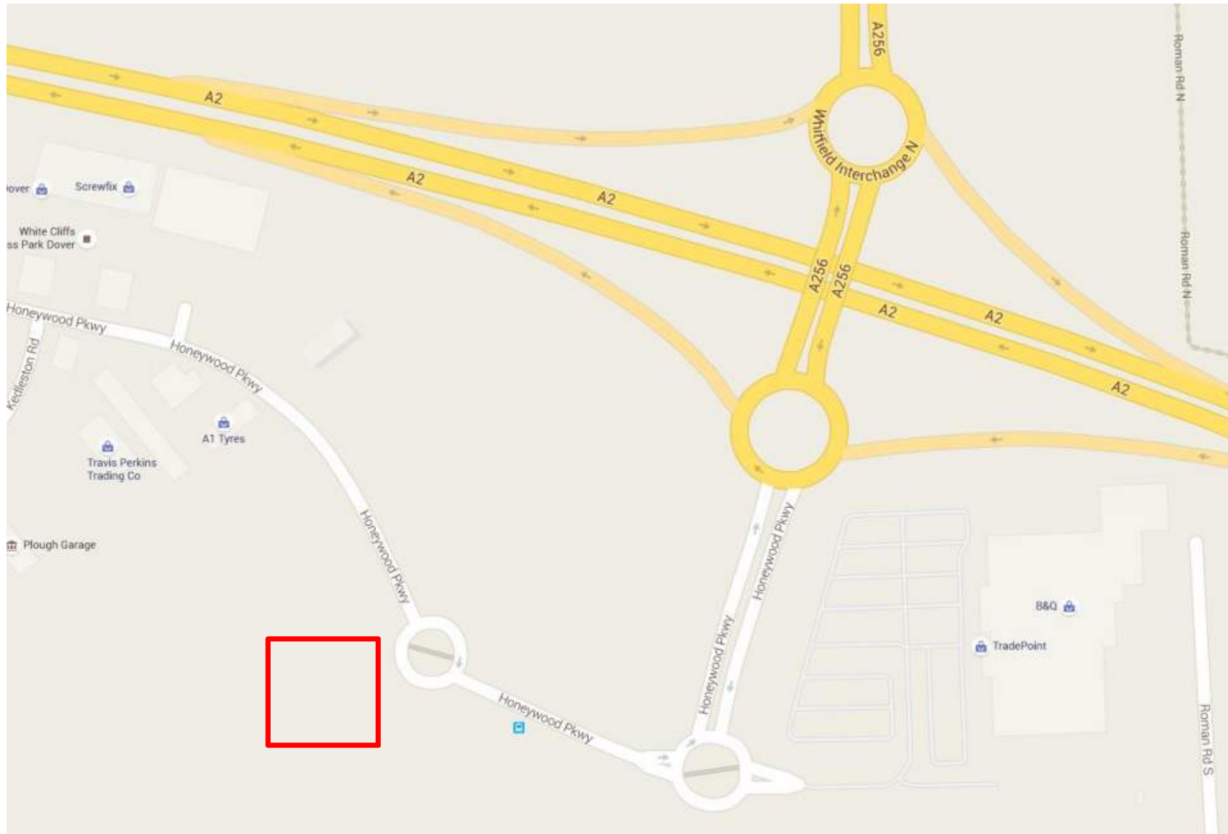


Figure 5.1: Site location (extract from Google Maps)

5.2.1 The site is currently a greenfield location bounded by Honeywood Parkway and a spur road to the east of the site.

Figure 5.2: Site Photograph with indicative redline boundary (Google Earth)

5.3 Geotechnical Considerations

5.3.1 The British Geological Survey (BGS) online map indicates that the sites bedrock geology is Margate Chalk Member. The sites superficial deposits are of Clay with flints formation, consisting of clay, silt sand and gravel.

5.4 Underground Services and Structures

5.4.1 A services search must be commissioned by the client in order to confirm the location of all the services in the areas where excavations are to take place.

5.5 Geo-environmental Risk Assessment

5.5.1 A ground contamination Preliminary Risk Assessment has not yet been undertaken.

5.6 Unexploded Ordnance Risk

5.6.1 An unexploded ordnance risk assessment has not yet been undertaken.

5.7 Ground Investigation

5.7.1 A ground investigation (GI) comprising fieldwork and corresponding laboratory testing will be required to assess and mitigate the geotechnical issues and risks associated with the construction of the proposed leisure centre and to assess the potential for contamination related risks.

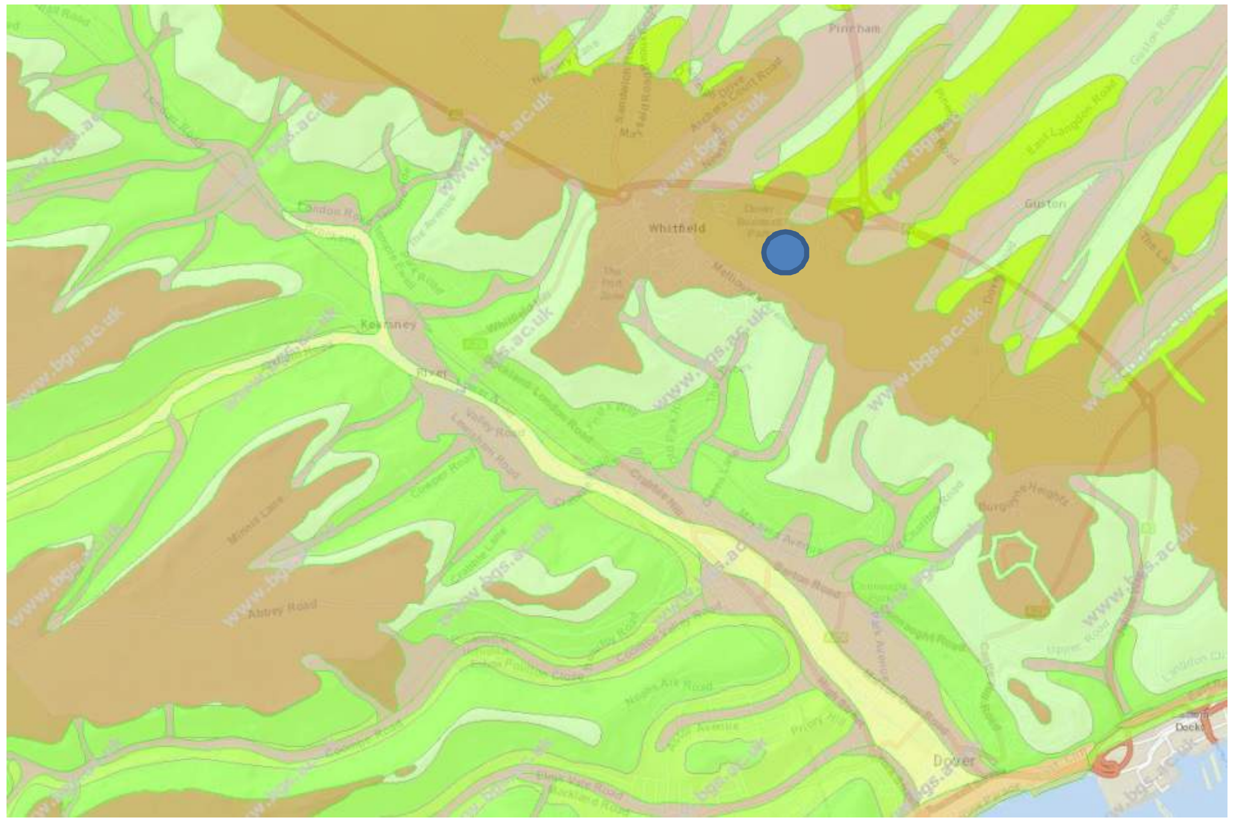


Figure 5.3: Superficial & Bedrock Geology (BGS)

6 SUBSTRUCTURE & FOUNDATIONS

6.1 Foundation Solutions

6.1.1 Based on the desktop study of the local geology and borehole data available on the BGS website we suggest that the foundation solution may be suitable for shallow pads and ground bearing slabs founded on the chalk.

6.1.2 Our experience of leisure centre construction suggests that shallow foundations and ground bearing pool structure are the most favoured starting point for foundation solutions from a cost perspective. From a cost perspective, allowance should be made for a piled foundation solution until further ground information is available.

6.2 RC Ground Bearing Slabs, Edge Beams & Upstands

6.2.1 At this stage of the design, a 200mm RC ground bearing slab with two layers of reinforcement has been assumed, to take account of any soft spots that may exist. This slab would have cut joints at regular bay centres to avoid cracking of architectural finishes.

6.2.2 The slab would be isolated from columns and pad foundations. A minimum 200mm zone is to be provided between underside of pad and foundation. In general areas the slab would be placed on a minimum of 300mm layer of engineered backfill, type 6F2, compacted in layers of 150mm. The final thickness of the engineering fill needs to be reviewed depending on the agreed site strip level and also depends on areas that might be over-dug to allow for ease of construction of substructure elements such as the pool.

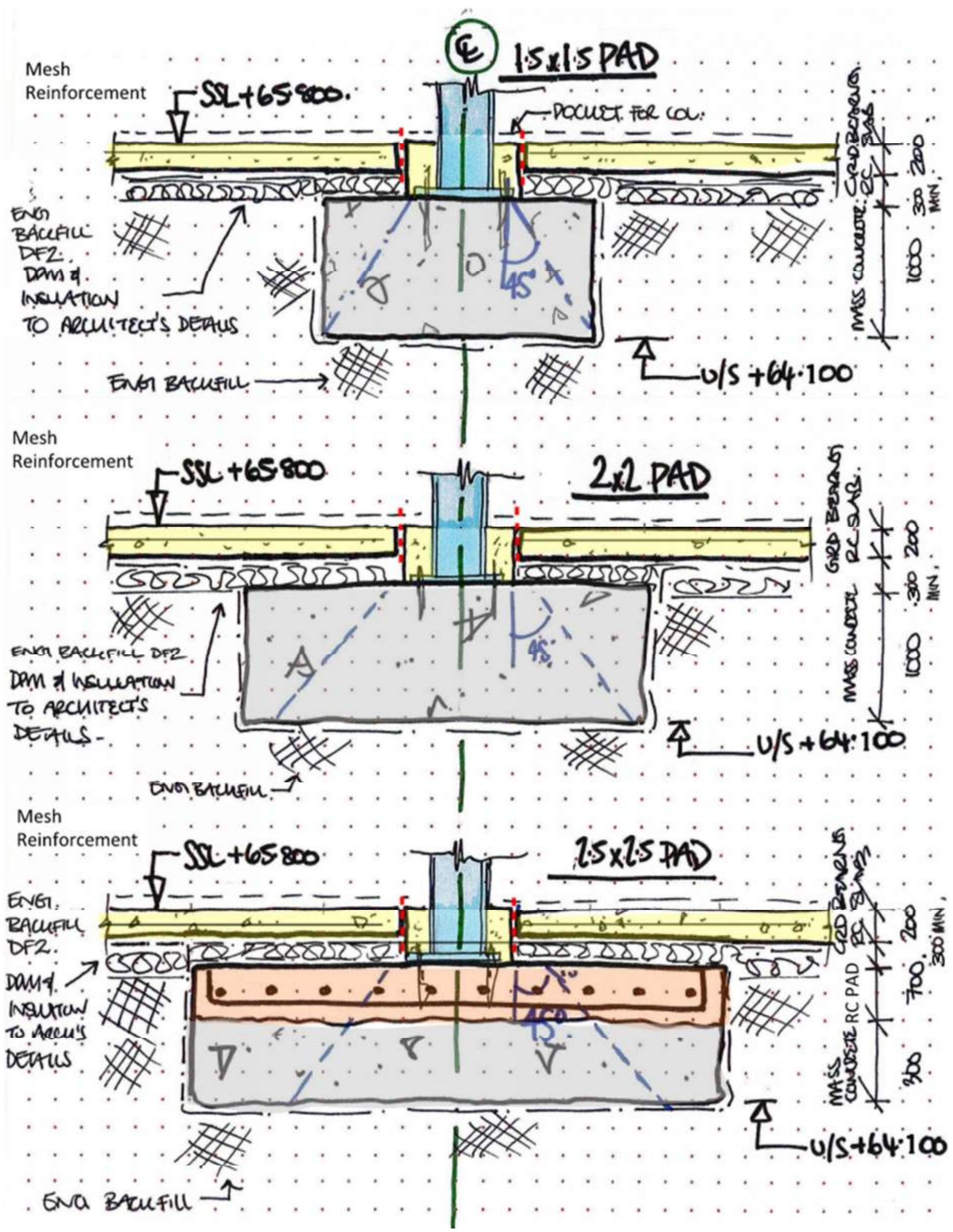


Figure 6.1: Typical Foundation Pad Options

6.2.3 The architectural finishes will determine the founding level of the slab. These typically range from 15mm for a skimming screed up to 300mm in changing areas. Where the slab changes level a 300mm RC thickening is to be provided. The final level of slabs will be coordinated at design Stage 4a.

6.2.4 The perimeter of the building has an in-situ ground beam that incorporates a step for masonry support. This spans between pad foundations is tied into the ground bearing slab. This edge beam can also be constructed in precast concrete if required for programme reasons.

6.2.5 The swimming pool area and changing village will require RC upstands and bunds to separate different areas. At this stage of the project typical details are provided by the Architect and should be allowed for in the cost plan.

6.3 Swimming Pool RC Walls and Slabs

6.3.1 We suggest that subject to ground conditions the swimming pool walls and base slab are to be built as in-situ reinforced concrete with a tiled finish.

6.3.2 The in-situ reinforced concrete option has been suggested at this design stage on the basis that it is a tried-and-tested method, with good availability of ground workers who can complete the works. Crack control will be managed through reinforcement scheduling. It should be noted that the concrete specification will have higher workmanship tolerances to ensure that the clear distances are achieved. These RC boxes will be designed to limited crack widths to provide water tightness without the need for any additives, however options for additives can be considered if thought to be advantageous from a programme perspective.

6.3.3 The swimming pool reinforced concrete walls generally vary from approximately 1.0m to 2.5m depth. The walls are typically 300mm thick and local areas will be thickened to 450mm to allow for scum channels to be incorporated in the wall. A horizontal movement joint is to be provided between the pool walls and ground bearing slab.

6.3.4 The base of the swimming pool is to be a 300-400mm thick reinforced concrete ground bearing slab. This thickness is required to enable reinforcement to lap from the wall into the base to resist bending from backfill placed behind the wall. The base slab will also be subject to hydrostatic pressures from the water table. As the pool depth is to be approximately 2.5m in the deepest location it is anticipated that by providing a 300-400mm base thickness will be approximately equal to the hydrostatic uplift forces.

6.3.5 Generally the pool construction is a programme critical activity. Given this, it is assumed that the reduced dig to formation level of the swimming pool will be one of the first works packages. It is assumed that the ground will be reduced and battered back to allow for the in-situ formwork to be erected. It is understood that foundations in close proximity to the pool tanks will be constructed at this lower level.

Figure 6.2: In-situ Reinforced Pool Tank Design at Grade

7 SUPERSTRUCTURE

7.1 Structural Framing

7.1.1 At this stage we suggest using a baseline structural option of a steel frame with long span truss over the swimming pool and long span cell beam roof, shallow RC foundations and in situ RC swimming pool. We have progressed the cladding design using a timber cassette envelope solution.

7.1.2 Other options to be explored include substituting the long span steel cell beam roof structure with steel trusses, glu-laminated beams or glu-laminated/steel truss combinations. Hybrid options incorporating cross laminated timber for floors, roofs and façade secondary elements can also be considered.

7.1.3 A more detailed appraisal of some of the long-span roof options discussed above is found in Appendix C ('Long Span Roof Studies', June 2016)

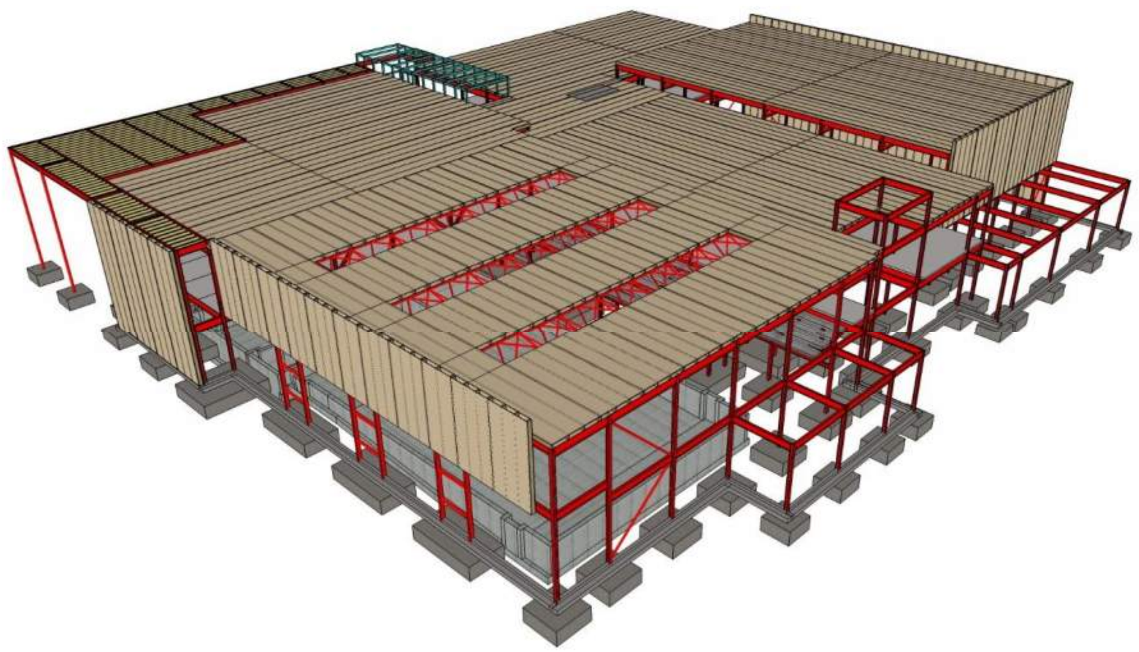


Figure 7.1: Baseline Option - Steel Frame with Timber Cassette Envelope

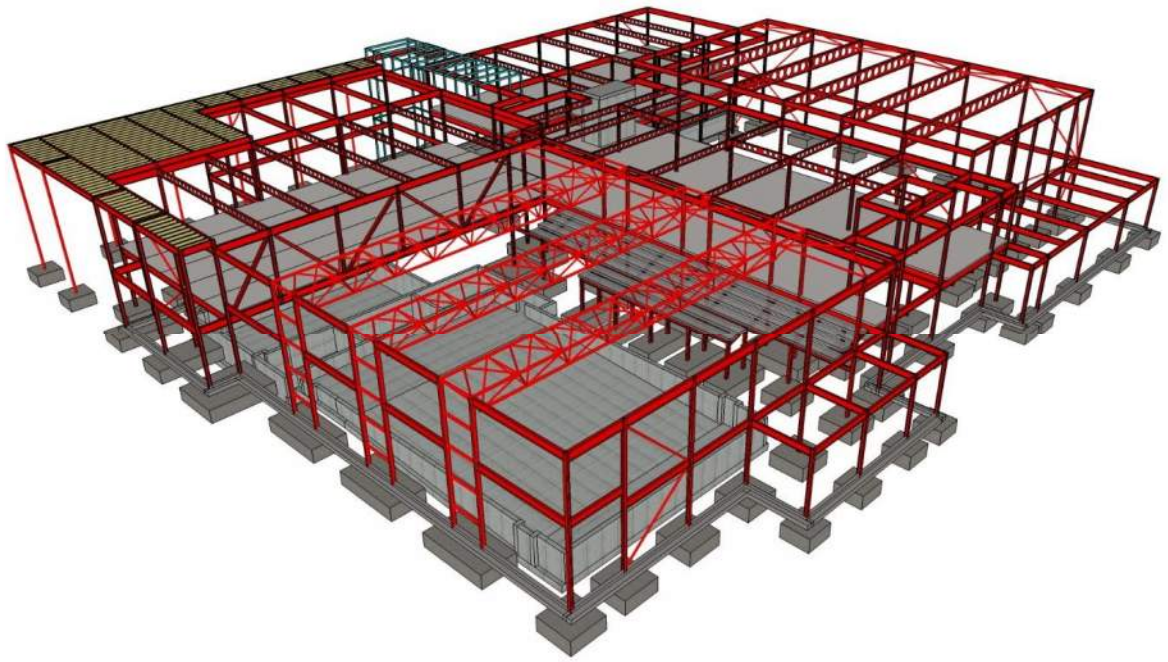


Figure 7.2: Baseline Option - Steel Frame with Truss & Celluar Beams

8 BUILDING ENVELOPE

8.1 Overview

8.1.1 The building envelope is a key structural component in all buildings. The coordination of external and internal skins provides an efficient building envelope solution and there are several structural components to the envelope.

8.1.2 The building envelope for leisure centres generally comprises of the following components:

- Roof Options – Timber cassette, Cross laminated Timber (CLT), and light weight steel and aluminium decking.
- Sports Hall & Swimming Pool high level cladding - Lightweight cladding panels (Kingspan) with secondary steel cold form backing system, timber cassettes
- Open elevations – glazed curtain walling with secondary steel cold form fixings as required.
- Sports Hall & Swimming Pool low level cladding – concrete block / brick masonry cavity system or other cladding material. Blockwork for solid wall construction.
- It should be noted CLT panels can also be used for wall elevations in lieu of blockwork and secondary steel systems.

8.2 Timber Cassette

8.2.1 Timber cassette panel with a high quality aesthetic to the soffit. This system typically spans multiple bays and is delivered to site as a sandwich panel with insulation and top ply board. The width of cassettes can be customised but typically are in widths of 2.4m to enable efficient stacking on transportation.

8.2.2 The deck consists of timber joists within the sandwich system that can normally span up to distances of 7.5m (though longer spans can sometimes be achieved with careful design). A weatherproof membrane is laid down upon an insulation layer and then finished with a zinc standing seam roof or other finish such as sarnafil etc.

8.3 Sports Hall Roof - Lightweight Steel Metal Deck

8.3.1 A lightweight metal deck panel is a common solution to large roofs over such buildings. The deck is fritted so that it can provide acoustic performance, as specified by the project acoustician. The deck is shot fired onto support structure to provide lateral restraint to the top flange. The deck span varies from 3m for the Tata Steel D100 profile to up to 8.5m for the Tata Steel D210 profile.

Figure 8.1: Timber Cassette System – Typical Details

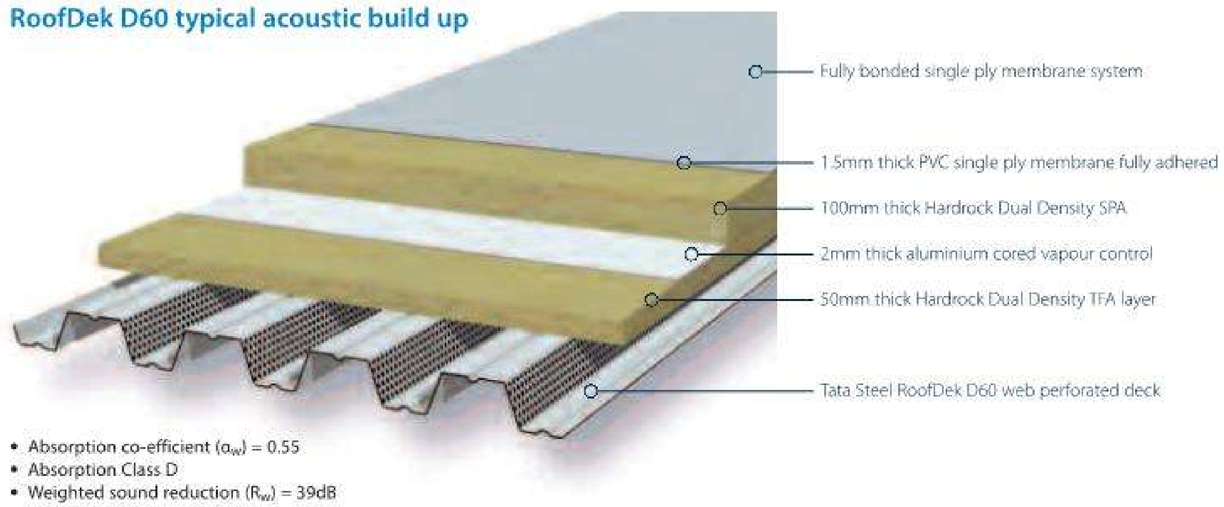


Figure 8.2: Steel Metal Liner Tray – Typical Details

8.4 Lightweight Cladding Panels

8.4.1 At high level in the swimming and sports hall areas a light-weight cladding panel system can be used to provide an efficient and quick to erect envelope. The Kingspan KS1000 (or similar) can span vertically or horizontally up to 5.0m, over multiple bays, to provide an effective cladding system.

8.4.2 The Kingspan panels can be used above the masonry zone in both halls, enclosing up to 6m between the top of the cavity wall and the underside of the roof structure. Trimming steels are included within the primary steelwork package to ensure the cladding panels have adequate support and lateral headers.

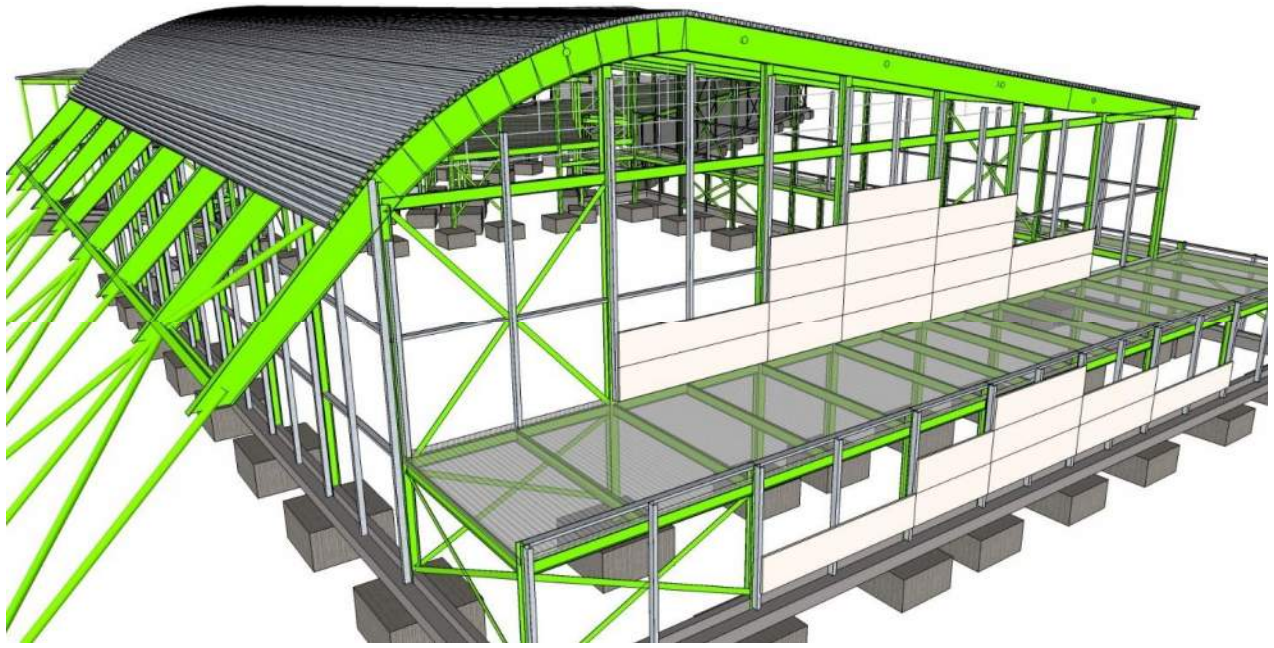


Figure 8.3: Suggested layout for Kinspan KS100 system with vertical secondary steelwork

8.5 Curtain Walling

8.5.1 The open zone features a glazed curtain wall system that wraps around the front elevation. This is supported from mullions and transoms at regular centres that hold the glazed panels in place. This secondary system is supported by the primary steelwork above and floor slab below.

8.5.2 The steelwork at first floor and roof will be designed for a deflection of span/500 to limit deflection for cladding sensitive areas.

Figure 8.4: Typical Façade System for Glazing

8.6 Block work and Brick Masonry

8.6.1 To provide a robust and durable façade at ground a masonry cavity system is generally proposed by the Architect.

8.6.2 This will feature a facing lignacite concrete outer skin and a lightweight concrete inner block, such as the Acheson and Glover A308 block. Masonry ties and windposts will be provided at regular centres transferring lateral loads back the primary frame.

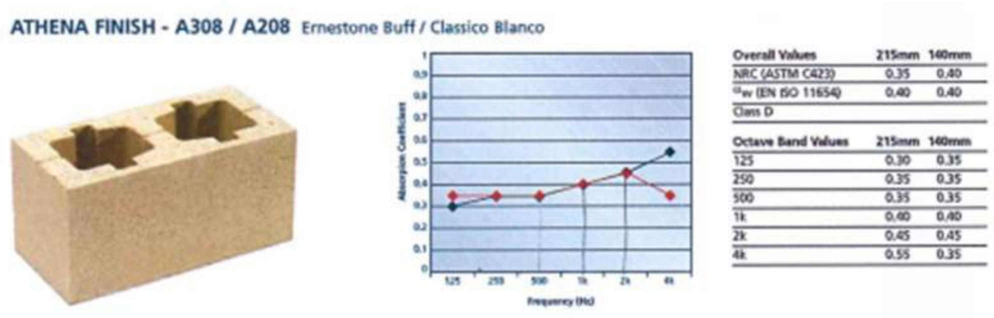


Figure 8.5: Typical lightweight Blockwork

9 CIVIL ENGINEERING WORKS

9.1 Hydrology

9.1.1 The Dour River is sourced approximately 1.5km to the south west of the site and is classified as an Environment Agency 'River' which is served by a catchment of 24.531 km^2. The stream joins the Kent South Coastal Water downstream.

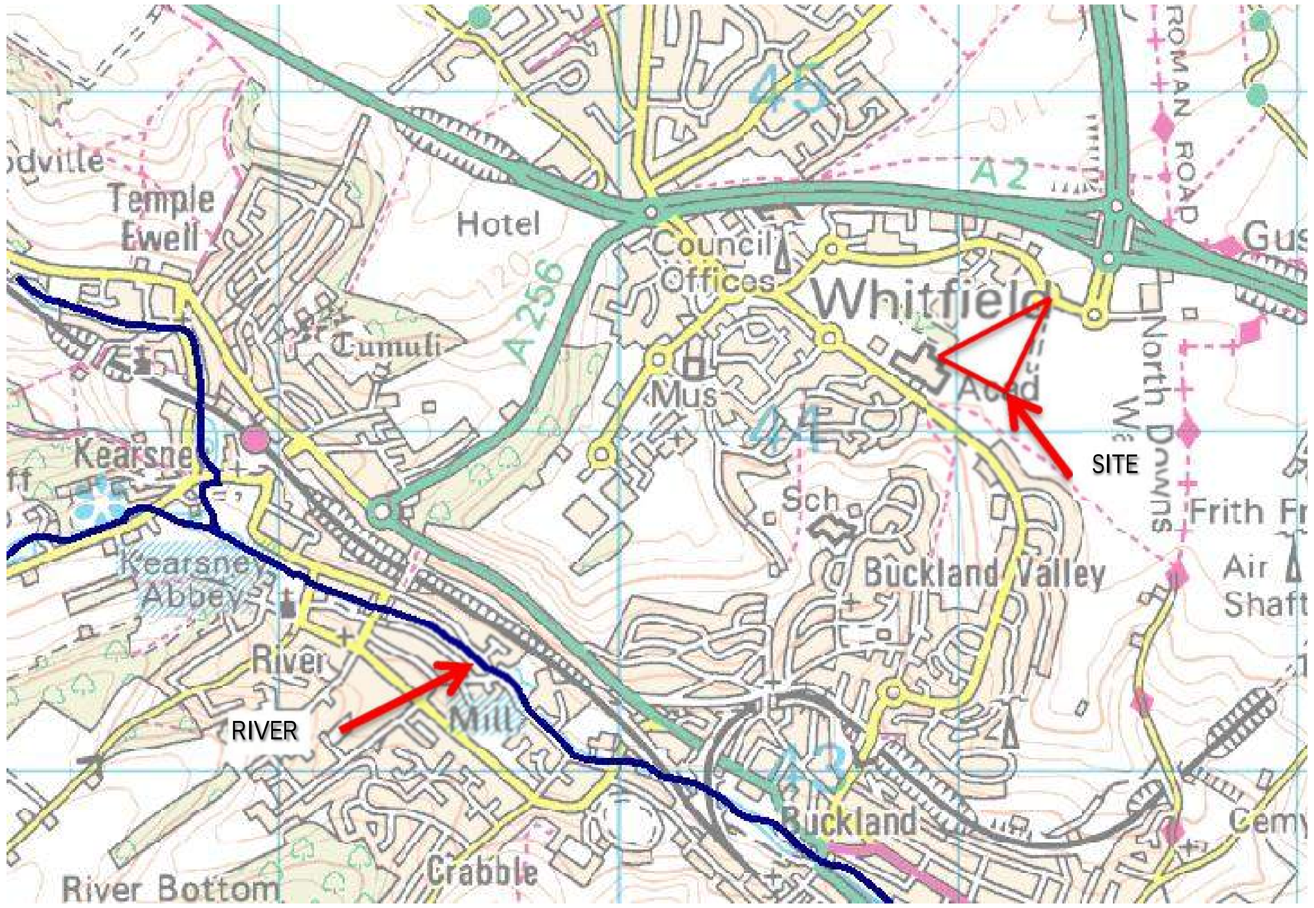


Figure 9.1: Site location to Salt Hill Stream (extract from OS Online Maps)

9.1.2 The Environment Agency groundwater map shows that the site is located in the total catchment (Zone 3) ground water protection zone and the groundwater vulnerability zone map shows the site located in a major aquifer intermediate area.

9.2 Geology

9.2.1 The British Geological Survey (BGS) online map indicates that the sites bedrock geology is Margate Chalk Member. The sites superficial deposits are of Clay with flints formation, consisting of clay, silt sand and gravel.

9.2.2 A detailed site investigation will be carried out to establish the sites local geology and ground conditions to determine if infiltration can be used as a method for disposal of clean surface water from the proposed development site.

9.3 Flood Risk

9.3.1 A review of the Environment Agency web based Flood Zone map indicates the development site does not fall within a dedicated flood zone, which means that the potential for flooding from rivers or sea is 0.1% (1 in 1000 year) or less. However as the site is over 1 hectare a site specific flood risk assessment will be required to support the site planning application.

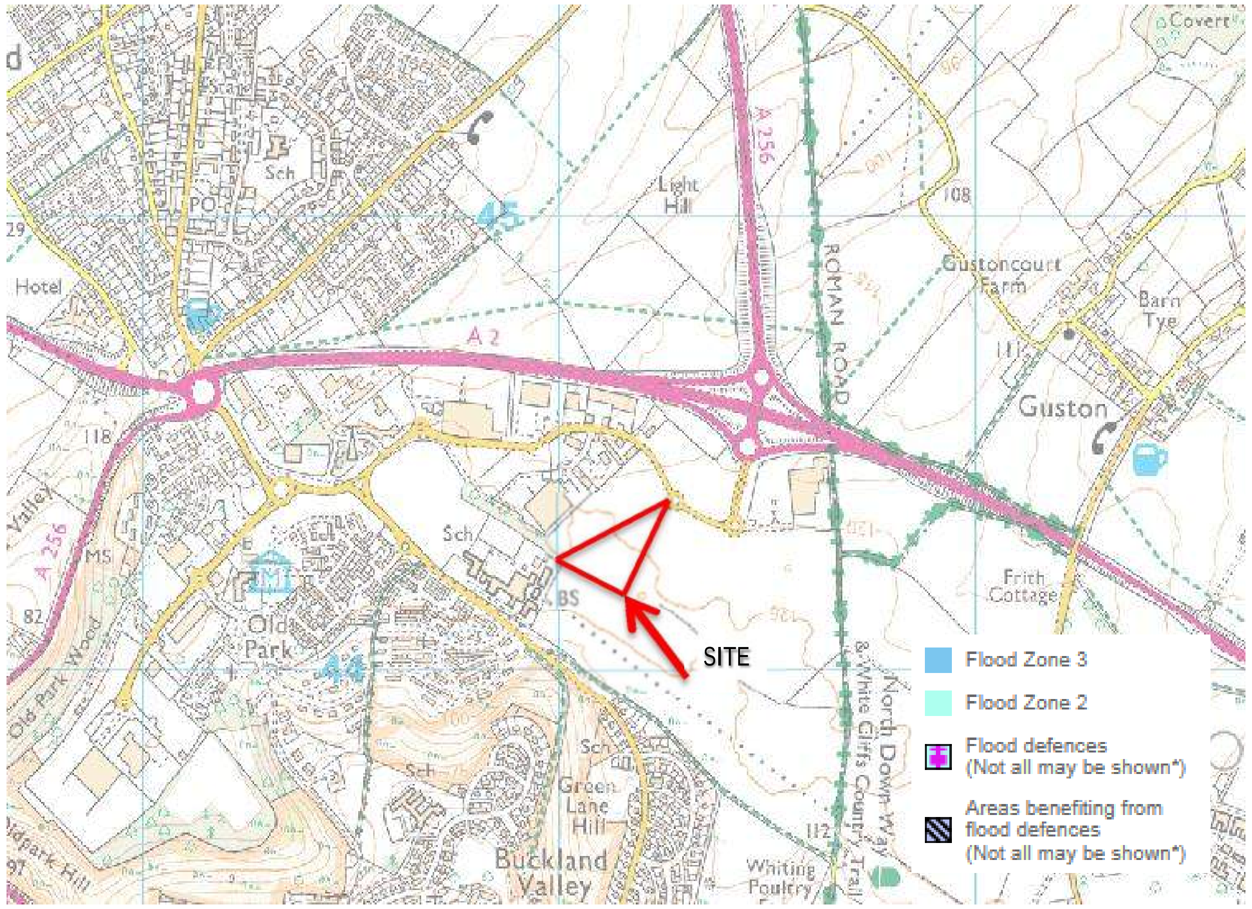


Figure 9.2: Environment Agency Flood Zone Map

9.4 Foul & Surface Water Drainage Strategy

9.4.1 The operational aim of the drainage infrastructure is to design a system that will meet the following minimum requirements:

- The required design life and structural integrity will be achieved for the new drainage system.
- The entire system is operational at all times and functions within the design performance requirements set out by the relevant statutory undertakers and end users.
- Meet current design standards as well as statutory and health and safety requirements.
- The operation of the system is safe, environmentally acceptable and economically efficient.
- To separately drain foul and surface water to an appropriate point of connection.

- To provide points of connection for proposed soil vent pipes, stub stacks and floor gullies as identified by the Public Health Engineer and Pool Specialist.
- To provide points of connection for proposed roof water downpipes as identified by the Architect.
- To provide drainage of hardstanding areas as identified by the Landscape Architect.
- To provide a means of controlling the rate of discharge of surface water run-off from the development, along with the appropriate storage, to prevent undue rush of flooding on or off site.

9.4.2 The design of the new drainage works is undertaken in accordance with:

- BS EN 752:2008 Drain and sewer systems outside buildings.
- Sewers for Adoption 7th Edition.
- Building Regulations Part H (Drainage and waste disposal).
- Kent County Council –The Soakaway Design Guide (July 2000)

9.5 Existing Drainage

9.5.1 As the site is currently a greenfield site it is not anticipated that there will be any below ground drainage on the site.

9.5.2 An asset map will be requested from Southern Water to ascertain the location of the nearest public foul and/or surface water sewer to the site. Following a review of planning applications for neighbouring lands on the Dover District Council Planning Portal, there appears to be a 225mm diameter foul sewer running in Honeywood Parkway with a 150mm foul spur adjacent to the proposed site, by the roundabout. According to Southern Water records this sewer is approximately 4.27m deep at an invert of 116.72m.

9.5.3 There is no record of a surface water sewer in the area.

9.5.4 A topographical survey should be carried out on the site, this will indicate if there are any ground features that suggest there is ditches/drains crossing/serving the site.

9.6 Proposed Foul Water Drainage

9.6.1 Relevant applications to Southern Water should be made as required, including pre-development enquiries and connection applications.

9.6.2 Access throughout the new drainage system will be provided through the use of manholes or rodding eyes at branch connections and changes in direction to allow the system to be properly maintained and for blockages to be removed.

9.6.3 Given the depth of public foul sewer it would be assumed that the foul water could drain by gravity to the public network. This will be dependent on the site layout and topography.

9.6.4 As swimming pools are proposed in the leisure centre it will be necessary to discuss the impacts of a trade effluent license with Southern Water. Having previously carried out discussions with statutory bodies for similar projects it is likely that the rate of discharge will need to be restricted and therefore a holding tank for the backwash water will be required. The volume and rates will be determined following discussions with the pool specialist and Southern Water.

9.6.5 The British Water Code of Practice for Flows and Loads will be used to calculate the proposed foul run-off. The anticipated foul sewerage flows will be determined for the proposed development when occupational values are available. Typically, for a sports centre, a foul loading rate of 50 litres per head per day would be used.

9.7 Proposed Surface Water Drainage

9.7.1 The strategy for the design of the surface water system will consider the hierarchical approach laid down within Part H of the Building Regulations, which requires the run-off from any new development to consider the following in order of preference:

- store rainwater for later use.
- use infiltration techniques, such as porous surfaces in non-clay areas.
- attenuate rainwater in ponds and open water features for gradual release.
- attenuate rainwater by storing in tanks or sealed water features for gradual release.
- discharge to watercourse.
- discharge rainwater to surface water sewer/drain.
- discharge rainwater to the combined sewer.

9.7.2 Given the geology of the site, it is anticipated that the surface water drainage will infiltrate to ground via soakaways or similar systems.

9.7.3 Given a large car park is proposed to serves the development a petrol interceptor will be required to treat the surface water runoff from this area. The use of permeable paving within the car park will eliminate the requirement for a petrol interceptor. This will be subject to agreement with the Environment Agency.

9.7.4 Relevant applications to the Environment Agency and the Lead Local Flood Authority (LLFA); Kent District Council; should be made, as required, including completing the council's SuDS pro-forma as part of the major development planning application.

9.7.5 The Greenfield runoff rate for the site was estimated to be 1.08 l/s. This was calculated using the IH 124 Greenfield runoff method. Based on the site location an SAAR and SPR value of 800 and 0.15 were used, respectively.

9.7.6 Calculations will be carried out for various storm return periods, as required by the SuDS proforma. These calculation will determine the volume of attenuation storage required for the development in order to prevent flooding.

9.7.7 The scheme will also incorporate sustainable urban drainage systems, where practicable. Refer to section 9.8 for details.

9.8 SuDS Proposals

9.8.1 In accordance with best practice requirements Sustainable urban Drainage Systems (SuDS) proposals are being considered for the development in order that the completed development run-off characteristics mimic the existing Greenfield as closely as possible, or to the rate agreed with relevant LLFA.

9.8.2 A concept known as SuDS Management train (also known as the treatment train) is shown on Figure 9.3. Drainage techniques similar to the way natural catchments function can be used to alter the flow and quality characteristics of the flow. This is achieved at different stages:

- Source Control: Managing the site could increase the quality (by minimising the use of de-icing products and garden chemicals, keeping paved areas clean to reduce first-flush pollution) and quantity problems (by reducing the paved areas).
- Site Control: Water should be returned to the natural drainage system as near to the source as possible.
- Regional Control: For large public areas storage could be shared between a number of sites.

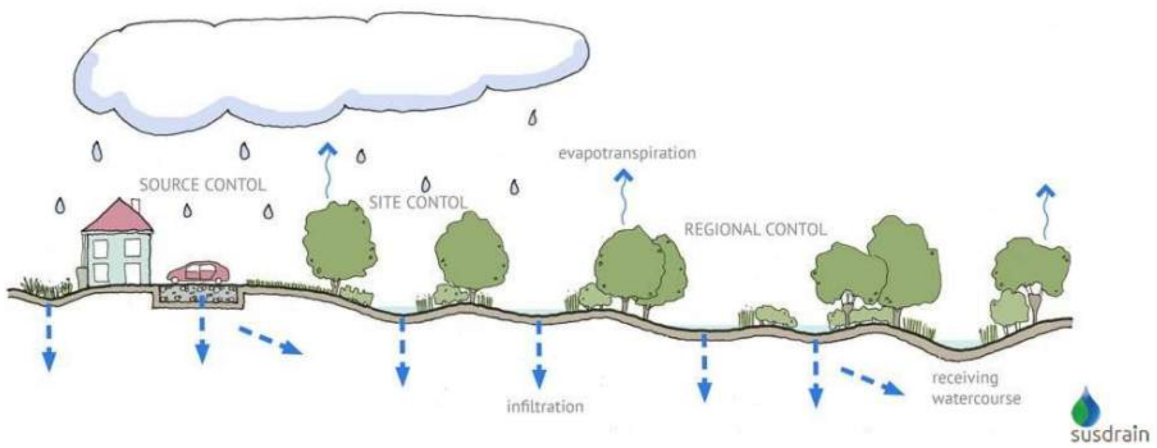


Figure 9.3 - SuDS Management Train

9.8.3 There are many SuDS technologies available to improve the quality and decrease the quantity of the storm water run-off from a development. The measures proposed for the site were selected to suit the particular circumstances of the development.

9.8.4 Table 9.1 details the SuDS measures that will be considered for the proposed development

	Proposed	Comment
Filter Drains	✓	Infiltration testing to be undertaken to confirm suitability
Swales	✓	Infiltration testing to be undertaken to confirm suitability
Infiltration Basins	✓	Infiltration testing to be undertaken to confirm suitability
Soakaways	✓	Infiltration testing to be undertaken to confirm suitability
Ponds	✓	To be investigated further ,although space may be an issue
Retention / Detention Basins	✓	To be investigated further ,although space may be an issue
Wetlands	X	Insufficient space on site
Trees	✓	To be investigated further
Pervious Surfaces	✓	Infiltration testing to undertaken to confirm suitability
Attenuation Tank	✓	Site conditions indicate feasiblity
Brown/Green Roofs	✓	To be investigated further
Rainwater Harvesting	✓	To be investigated further

Table 9.1 – SuDS Measures Proposed

9.8.5 Once the proposed layout, geological and hydrological information and proposed runoff rates have been finalised the SuDS features will be fully assessed and a detailed drainage design will be developed. Further details of SuDS measures are listed below.

9.8.6 **Green Roofs** comprise a multi-layered system that covers the roof of the building with vegetation cover/landscaping over a drainage layer. They are designed to intercept and retain precipitation, reducing the volume of runoff and attenuating peak flows.

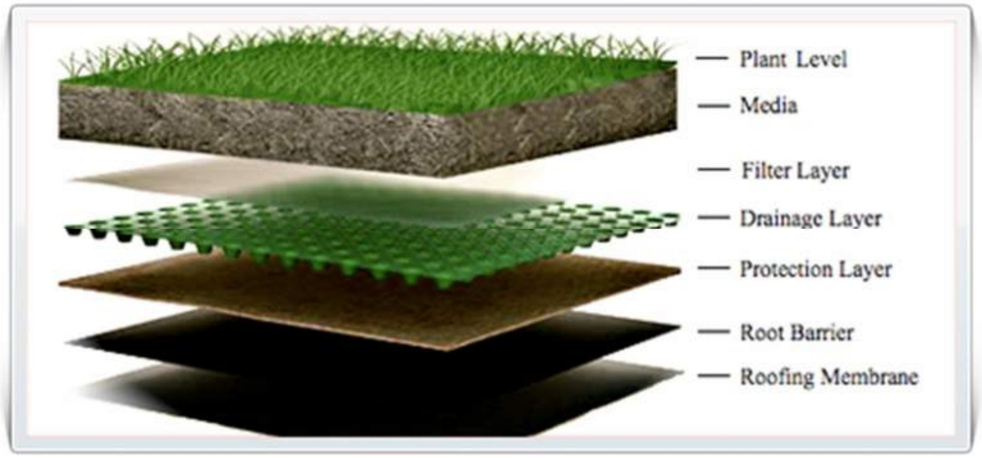


Figure 9.4 – Typical Green Roof Build Up

9.8.7 **Rainwater harvesting** stores rainwater from roofs, which can then be reused to serve the development toilets and landscaping. These systems can reduce the rates and volumes of surface water runoff from the site.

Figure 9.5 – Indicative Rainwater Harvesting Layout

9.8.8 **Pervious surfaces** provide a surface suitable for pedestrian and/or vehicular traffic, while allowing rainwater to infiltrate through the surface and into underlying layers. The water can be temporarily stored before infiltration to the ground, reused, or discharged to a watercourse or other drainage system. Surfaces with an aggregate sub-base can provide good water quality treatment.

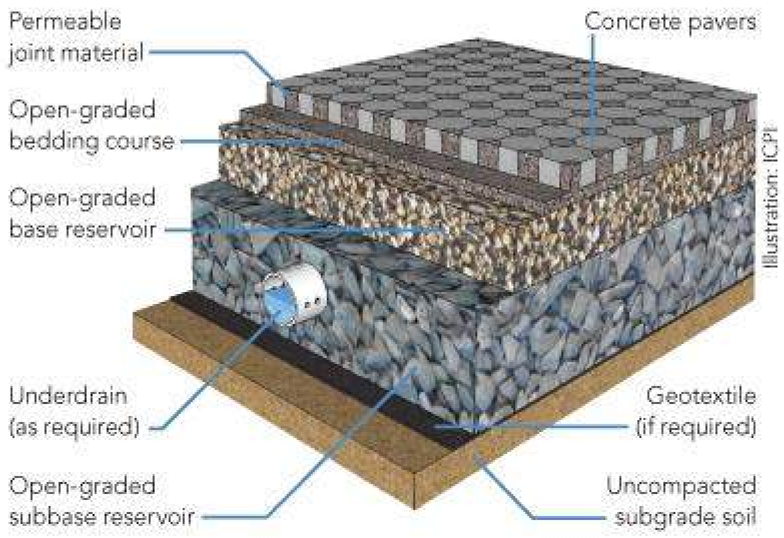


Figure 9.6 – Typical Pervious Paving Build Up

9.8.9 **Detention basins** are surface storage basins or facilities that provide flow control through attenuation of stormwater runoff. They also facilitate some settling of particulate pollutants. Detention basins are normally dry and, in certain situations, the land may also function as a recreational facility. However, basins can also be mixed, including both a permanently wet area for wildlife or treatment of the runoff and an area that is usually dry to cater for flood attenuation.

9.8.10 **Retention ponds** can provide both stormwater attenuation and treatment. Runoff from each rain event is detained and treated in the pool. The retention time promotes pollutant removal through sedimentation and the opportunity for biological uptake mechanisms to reduce nutrient concentrations.

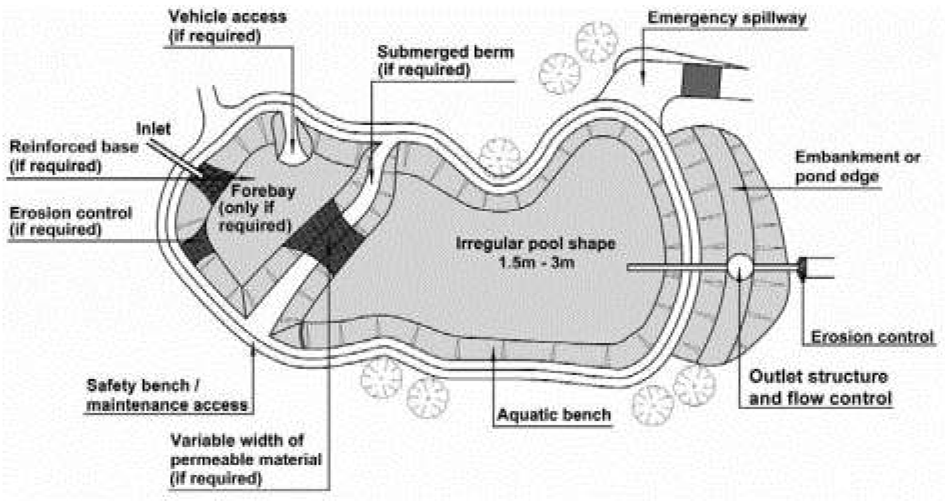


Figure 9.7 – Example of a Retention Pond / Detention Basin

9.8.11 **Soakaways** are square or circular excavations either filled with rubble or lined with brickwork, pre-cast concrete or polyethylene rings/perforated storage structures surrounded by granular backfill. Soakaways provide stormwater attenuation, stormwater treatment and groundwater recharge.

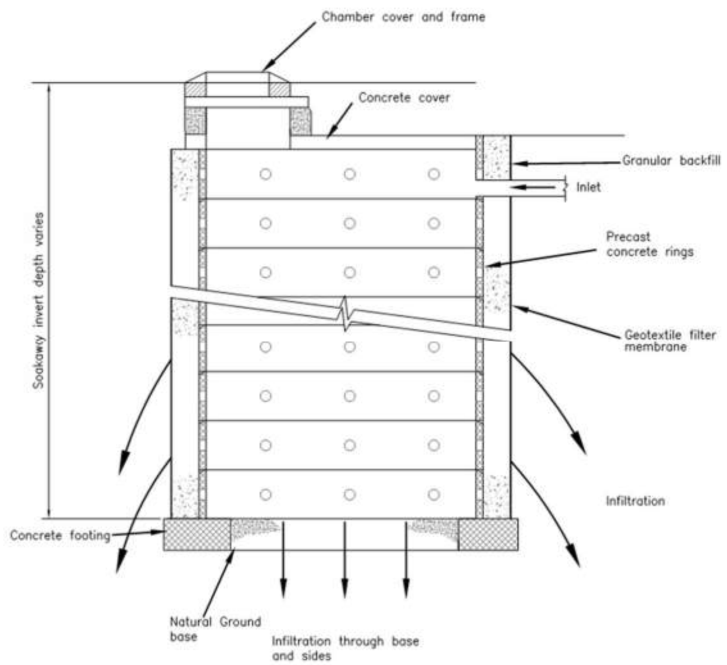


Figure 9.8 – Typical Soakaway Layout

9.8.12 **Infiltration basins** are vegetated depressions designed to store runoff on the surface and infiltrate it gradually into the ground. They are dry except in periods of heavy rainfall.

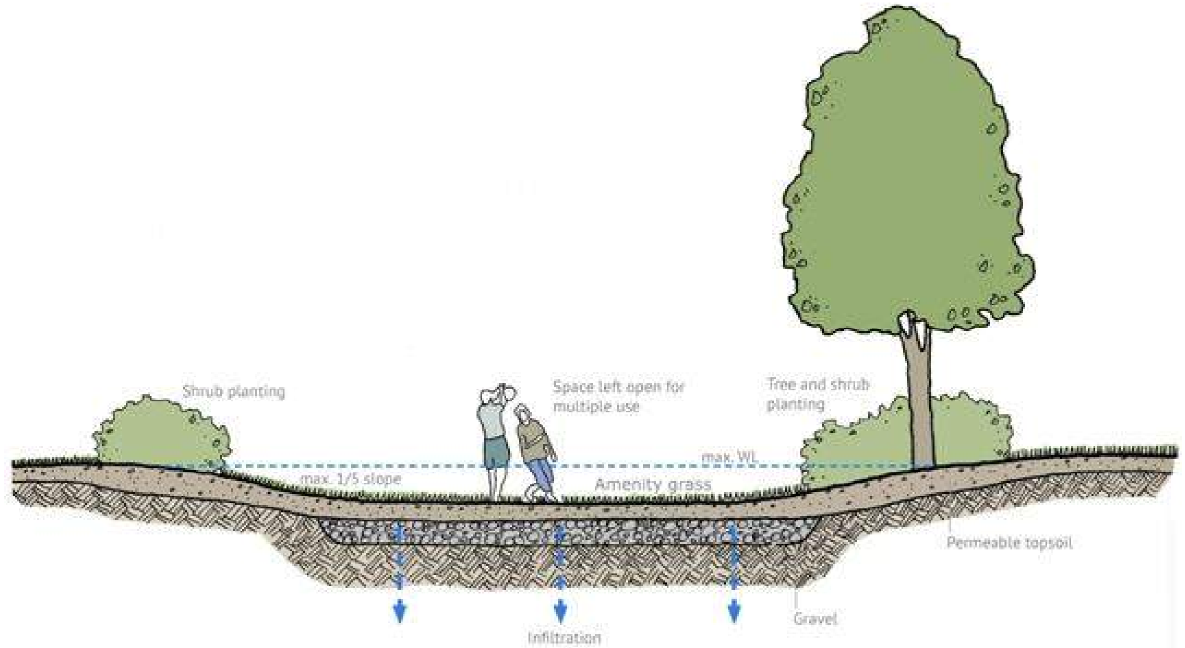


Figure 9.9 – Typical Infiltration Basin Layout

9.8.13 **Swales** are shallow, broad and vegetated channels designed to store and/or convey runoff and remove pollutants. They are designed to promote infiltration where soil and groundwater conditions allow. Check dams and berms also can be installed across the flow path of a swale in order to promote settling and infiltration.

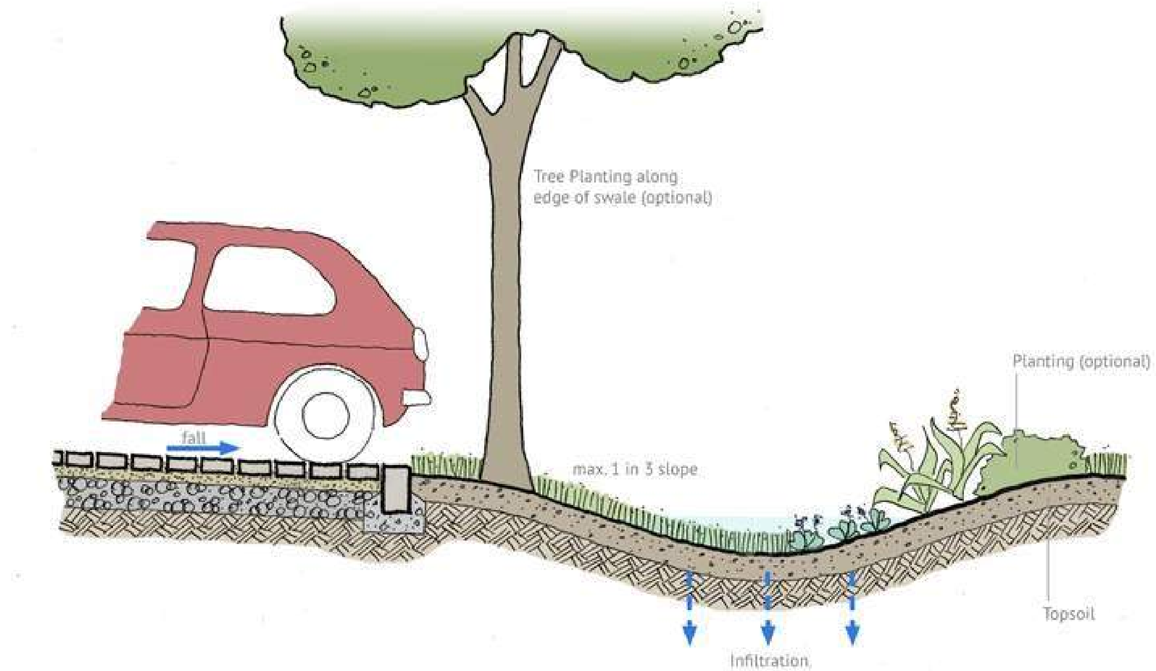


Figure 9.10– Example of a Swale

9.8.14 A **filter strip** is a gravel filled trench, generally with a perforated pipe at the base. Runoff flows slowly through the granular material, trapping sediments and providing attenuation. Flow is then directed to a perforated pipe, which conveys run-off either back into the sewerage network or into a waterbody.

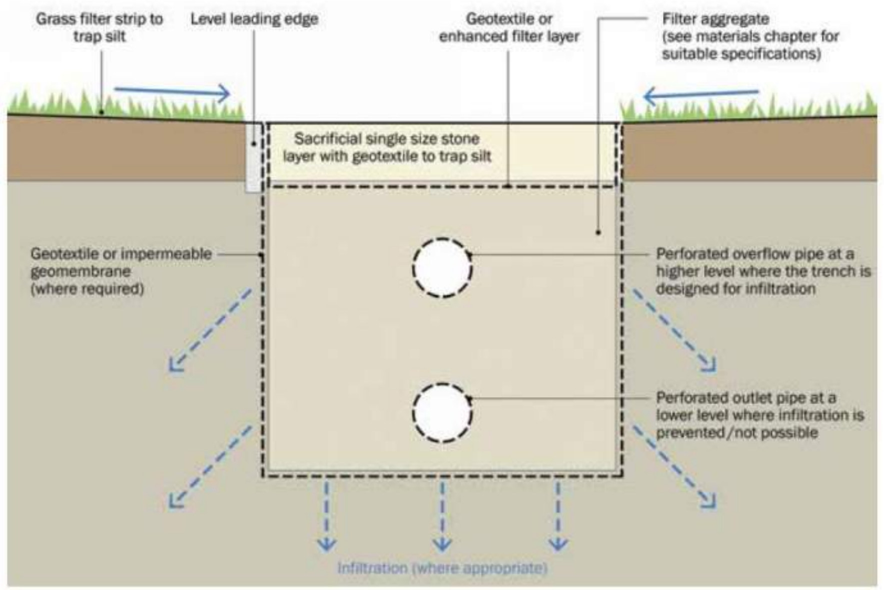


Figure 9.11 – Typical Filter Strip Build Up

10 SUSTAINABILITY

10.1 General

10.1.1 Sustainability is a key feature in the design processes that Engenuiti undertakes. As an industry we use a significant amount of the Earth's natural resources and by default this means we can significantly reduce our resource and energy demands in the projects we design.

10.1.2 For this project a number of sustainability considerations have been included in the design and a number more should be considered in the future. In particular the use of solid timber in lieu of structural steel and either block work or cold formed steel secondary backing systems should be explored.

10.1.3 Concrete will be proposed in which the cement content could be reduced by using cement replacements such as pulverised fuel ash or ground granulated blast furnace slag to form a more sustainable mix. The decision to use concrete has been based on sound engineering principles and hence reducing the impact of using a large quantity is the most sustainable option. Where exposed concrete is to be used, careful selection of additives should be made to ensure that colour consistency is not degraded to the point where the finish is left unacceptable and requires painting.

10.2 Concrete

10.2.1 The global cement industry accounts for around 5% of global CO_2 emissions (source: World Business Council for Sustainable Development). The construction and demolition of buildings accounts for around 120 million tonnes of waste material in the UK, about half the national total waste.

10.2.2 There are significant opportunities for concrete construction to reduce its environmental impact through the specification and construction processes.

10.3 Conservation of Natural Resources

10.3.1 Although global supplies of the raw materials used to make cement, and aggregates used in concrete are not in short supply, their extraction can cause damage to their local environment. It is generally more sustainable to make use of a waste product in lieu of extracting more raw material: it has the double benefit of conserving natural resources for use by future generations and reducing the problem of disposal of unwanted materials.

10.3.2 Cement replacements – GGBS and PFA cannot replace 100% of the OPC used in cement as they rely on the hydration products from the lime to 'kick start' their own hydration reactions. However, 30 - 50% replacement is very common and will have limited effects on the concrete. Replacement rates of 80% are possible in certain circumstances. This has the potential to save a large amount of reserves of lime and clay, the raw materials used to make OPC.

10.3.3 Recycled aggregates – as the material that makes up the largest proportion of concrete by mass, the use of recycled coarse aggregates have a significant effect on reducing the mass of raw material used to make cement. The use of recycled fine aggregates is also possible and beneficial for similar regions.

10.3.4 Water – concrete manufacturers with a well developed environmental management systems should be recycling much of their water, as a great deal can be wasted in batching plants, through washing out machinery and lorries. Simple procedures minimise the use of water, with obvious benefits, especially in dry climates where it is a resource in short supply.

10.3.5 Formwork – by increasing the number of times formwork panels can be reused, the volume of material required on a project will be greatly reduced.

10.3.6 Release agents – there are many different types of release agents for use on formwork systems, made from different raw materials. Those that are derived from vegetable oil or other biodegradable sources, rather than petroleum based materials are preferable from a sustainability point of view, as they are made from readily renewable materials. They may cost more per litre, but the coverage rate of the petroleum based versions should be checked: often they require more coats, so the cost per m^2 of formwork is similar and the labour cost may be more.

10.4 Embodied Energy and Embodied CO_2

10.4.1 Although the cement industry has been making significant steps to improve efficiency and so reduce its CO_2 emissions, it will always be a major emitter as the chemical reaction involved in the manufacture of OPC produces CO_2 as a waste product. The drive to reduce the carbon footprint of industrial processes has resulted in significant interest in using cement replacement materials in concrete to reduce its carbon footprint.

10.4.2 Measuring the embodied CO_2 of raw materials is not a simple process, and depends very much on the boundary conditions and methodologies that are applied.

10.4.3 However, Table 10.1 shows data that can be used to make 'order of magnitude' comparisons. WRAP (Waste Reduction Action Programme) is private company in the UK which works in partnership with organisations to reduce waste and increase recycling.

	Embodied Energy MJ / tonne	**Embodied CO_2** Kg CO_2 / tonne
OPC	4770	800
GGBS	436	100
PFA	12	1

Table 10.1 - Embodied energy and CO_2 data (WRAP carbon calculator)

10.4.4 It can be seen that significant savings can be made by replacing OPC with replacements. An early estimate of the volume of concrete to be used in the project is around 9500m^3. Assuming a typical mix that contains around 16% of cementitious materials by mass, and the use of a blended cement of 50% OPC, 50% replacement material, the CO_2 saving on the project will be approximately 1000 tonnes or 1500 tonnes, depending on whether GGBS or PFA are used.

10.4.5 It is not thought that the use of recycled aggregates offers a saving in embodied energy or CO_2 due to the significant processing that it must undergo in order to be used in most circumstances (transport from its original location, crushing if necessary, washing, grading etc.).

10.5 Use of Thermal Mass in Building Cooling Strategies

10.5.1 Internal temperature control is typically a large source of energy consumption and CO_2 emissions of buildings.

10.5.2 Concrete framed buildings can be used to reduce this energy demand by acting as a 'heat sink' during the day when the building is heated by internal activity and sunlight. It can then release this heat during the night time, provided it is adequately ventilated by a supply of fresh air to which it can transfer its stored heat. The overall effect is to reduce the peak temperatures within the building and introduce a time lag between the peak external and internal temperatures, reducing the load on ventilation systems working to maintain a comfortable temperature for the people inside.

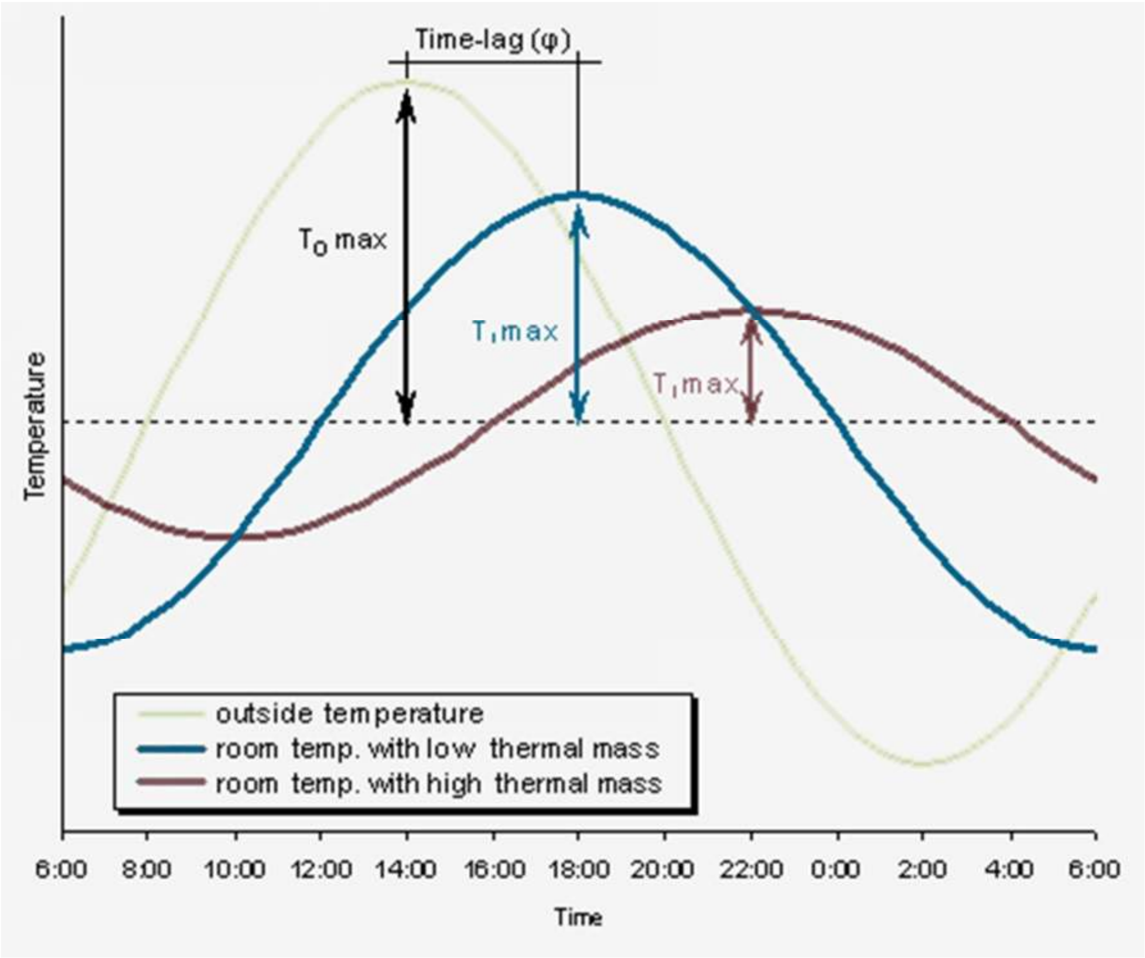


Figure 10.1 - Effect of high thermal mass on the internal temperature of a typical building (European High Quality Low Energy Buildings (EULEB) project)

10.6 Transport of Materials

10.6.1 The movement of heavy materials across long distances can account for large amounts of energy and CO_2 emissions. Table 10.2 gives approximate values for emissions per mile of various modes of transport.

	CO_2 emissions / passenger-mile
Typical large car	0.4 kg
Train	0.1 kg
Plane	0.25 kg

Table 10.2 - Embodied CO_2 emissions for transport modes (Transport Direct)

10.7 Socio-Economic Factors

10.7.1 Some materials used in construction can be certified under a 'chain of custody' scheme, provided the supplier can demonstrate they source responsibly and have an environmental management system in place that restricts the environmental impact of their product. The FSC & PEFC certification systems that applies to all timber used in construction, including plywood formwork panels, is one such scheme that is now standard practice in the UK. 'Eco-reinforcement' is another example, introduced very recently, that will apply to steel reinforcement used in concrete structures: having the eco-reinforcement certification will verify the product is made from 100% recycled steel.

10.7.2 There are strong sustainability arguments for using local labour resources wherever possible. Construction is a major source of employment and it is thought this project will provide work to a large number of local people. Offering training to local people will increase their capacity to contribute to their local economy.

11 FURTHER STUDIES & INVESTIGATIONS REQUIRED

11.1 Further Surveys & Investigations Required

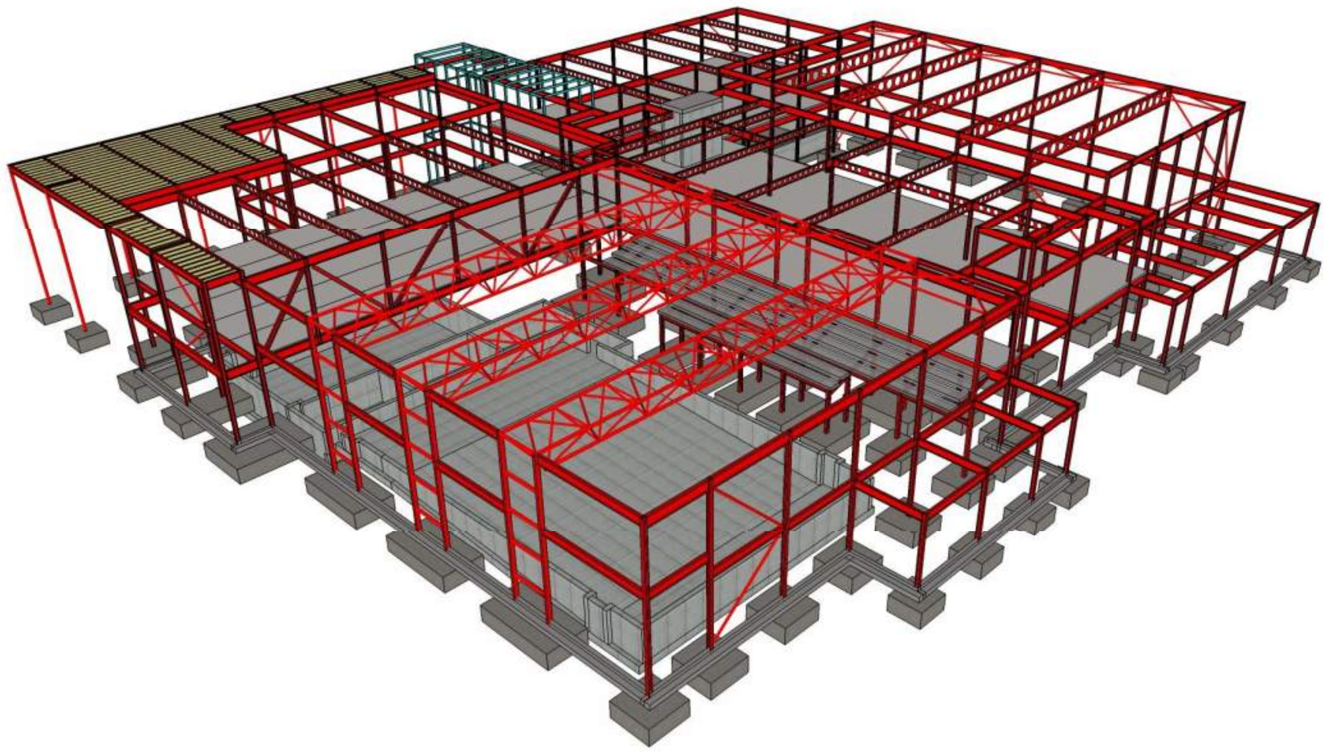
11.1.1 The following surveys and investigations are required in order to support the next phase of design:

Survey	Reason / scope	Proposed Timescale
Topographic Survey	To establish site levels and boundaries.	ASAP
Geotechnical Site Investigation	To establish geotechnical design parameters, ground conditions etc.	ASAP
UXO Desk Study	To establish site risk.	ASAP

Table 11.1 - Additional Surveys and Investigations Recommended

APPENDIX A

STRUCTURAL & CIVIL ENGINEERING DESIGN CRITERIA & MATERIALS



engenuiti

DOVER LEISURE CENTRE

STRUCTURAL & CIVIL ENGINEERING DESIGN CRITERIA & MATERIALS

for

GT3 Architects

17th June 2016

634-S-REP-002
Rev 0

Engenuiti
2 Maltings Place
Tower Bridge Road
London, SE1 3JB

STRUCTURAL & CIVIL ENGINEERING DESIGN CRITERIA & MATERIALS

CONTENTS

Revision History

Rev	Date	Purpose/Status	Document Ref.	Comments
00	17th June 2016	Draft	634-S-REP-002	Issued for Information

Prepared by:

Reviewed & Approved by:

Chris Law
Senior Engineer

Sarah Curran
Associate

Paul Grimes
Director

1 INTRODUCTION

1.1 General

1.1.1 Engenuiti has been appointed by GT3 Architects Limited to provide structural & civil engineering design services for the proposed new Dover Leisure Centre.

1.1.2 The purpose of this Structural & Civil Engineering Design Criteria & Materials report is to describe the structural and civil engineering design criteria of the proposed development and provide outline material specifications to enable GT3 Architects to finalise the design parameters for the project.

1.1.3 This report has been produced for the exclusive use of GT3 Architects Limited and should not be used in whole or in part by any third parties without the express permission of Engenuiti in writing. This report should not be relied upon exclusively for decision-making purposes and should be read in conjunction with other documents and drawings produced by the design team.

1.2 Proposed Development

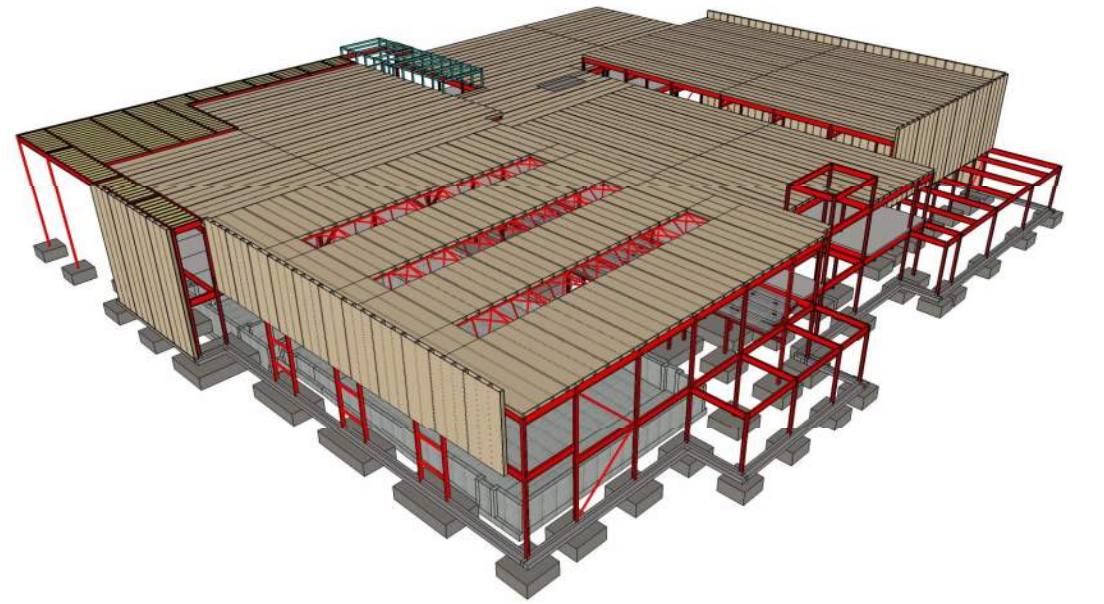
1.2.1 The proposed leisure centre is located in Whitfield, Dover. The site postcode is CT16 3FH. The site location is south of Honeywood Parkway and east of The Glenmore Centre.

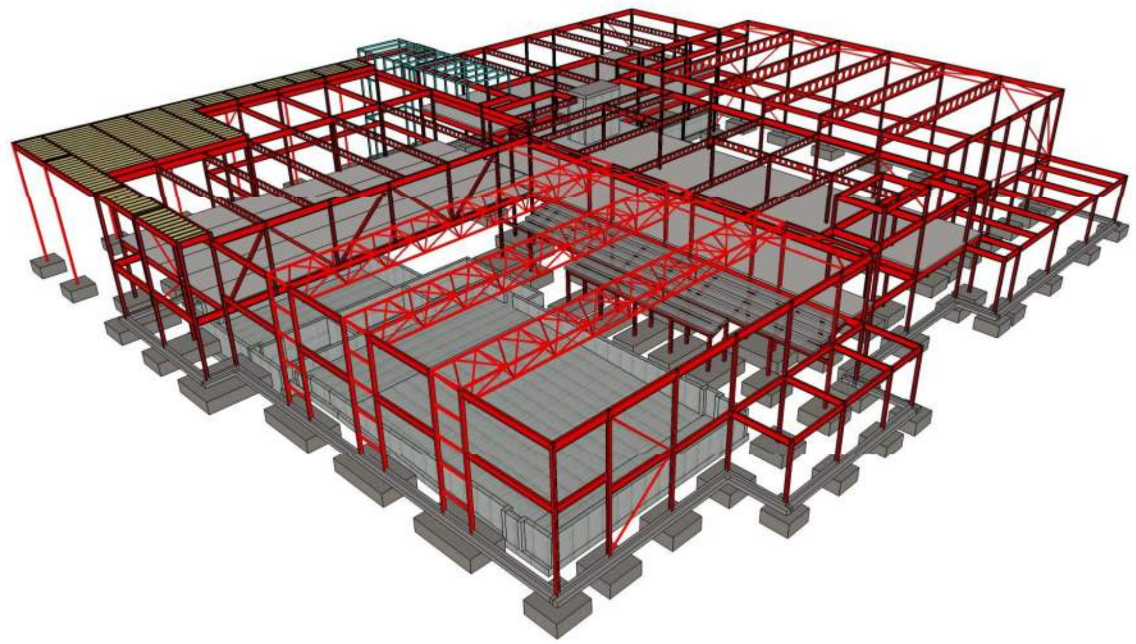
1.2.2 The site is currently a greenfield location bounded by Honeywood Parkway and a spur road to the east of the site.

1.2.3 The proposed leisure centre is a new build facility. The new facility will be designed around the following accommodation mix:

- 8 lane 25m pool
- Learner pool with moveable floor
- Wet changing village
- Activity zone around a new café space
- 4 court sports hall with associated changing
- Treatment rooms
- Gymnasium
- 2 large dance studios
- Spinning studio.

1.2.4 At this stage this Design Criteria & Materials report is based around a structural solution of steel frame with long span cell beam roof, shallow RC foundations and in situ RC swimming pool. The document will be developed as the design evolves.





2 DESIGN CODES

2.1 Design Codes

Eurocode Ref	Eurocode	National Annex
BS EN 1990:2002+A1:2005	Eurocode - Basis of structural design	NA to BS EN 1990:2002 (UK National Annex for Eurocode 0 – Basis of structural design)
BS EN 1991-1-1:2002	Eurocode 1: Actions on structures – Part 1-1: General actions – Densities, self-weight, imposed loads for buildings	NA to BS EN 1991-1-1:2002 (UK National Annex to Eurocode 1: Actions on structures – Part 1-1: General actions – Densities, ...)
BS EN 1991-1-2:2002	Eurocode 1: Actions on structures – Part 1-2: General actions – Actions on structures exposed to fire	NA to BS EN 1991-1-2:2002 (UK National Annex to Eurocode 1: Actions on structures – Part 1-2: General actions – Actions on structures exposed to fire
BS EN 1991-1-3:2003	Eurocode 1: Actions on structures – Part 1-3: General actions – Snow Loads	NA to BS EN 1991-1-3:2003 (UK National Annex to Eurocode 1: Actions on structures – Part 1-3: General actions – Snow Loads)
BS EN 1991-1-4:2005	Eurocode 1: Actions on structures – Part 1-4: General actions – Wind actions	
BS EN 1991-1-5:2003	Eurocode 1: Actions on structures – Part 1.5: General actions – Thermal actions)	NA to BS EN 1991-1-5:2003 (UK National Annex to Eurocode 1: Actions on structures – Part 1.5: General actions – Thermal actions)
BS EN 1991-1-7:2006	Eurocode 1: Actions on structures – Part 1-7: General actions – Accidental actions	
BS EN 1992-1-1:2004	Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings	NA to BS EN 1992-1-1:2004 (UK National Annex to Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings) (+A1:2009)
BS EN 1992-1-2:2004	Eurocode 2: Design of concrete structures – Part 1-2: General rules – Structural fire design	NA to BS EN 1992-1-2:2004 (Uk National Annex to Eurocode 2: Design of concrete structures – Part 1-2: General rules – Structural fire design)
BS EN 197-1:2000+A1:2004+A3:2007	Cement – Part 1: Composition, specifications and conformity criteria for common cements	
BS EN 934-2:2009	Admixtures for concrete, mortar and grout Part 2: Concrete admixtures – Definitions, requirements, conformity, marking and labelling	n/a
BS EN 206-1:2000+A1:2004+A2:2005	Concrete – Part 1: Specification, performance, production and conformity	BS 8500-1:2006 BS 8500-2:2006

Eurocode Ref	Eurocode	National Annex
BS 8102:2009	Code of practice for protection of below ground structures against water from the ground	
BS 8500-1:2006	Concrete – Complementary British Standard to BS EN 206-1 – Part 1: Method of specifying and guidance for the specifier	
BS 8500-2:2006	Concrete – Complementary British Standard to BS EN 206-1 – Part 2: Specification for constituent materials and concrete	
BRE Special Digest 1:2005 Third Edition	Concrete in aggressive ground	n/a
BS EN 1993-1-1:2005	Eurocode 3: Design of steel structures – Part 1-1: General rules and rules for buildings	NA to BS EN 1993-1-1:2005 (UK National Annex to Eurocode 3: Design of steel structures Part 1-1: General rules and rules for buildings) (2008)
BS EN 1993-1-3:2006	Eurocode 3: Design of steel structures – Part 1-3: Cold-formed thin gauge members and sheeting	
BS EN 1993-1-5:2006	Eurocode 3: Design of steel structures – Part 1-5: Plated structural elements	
BS EN 1993-1-8:2005	Eurocode 3: Design of steel structures – Part 1-8: Design of joints	NA to BS EN 1993-1-8:2005 (UK National Annex to Eurocode 3: Design of steel structures Part 1-8: Design of joints) (2008)
BS EN 1994-1-1:2004	Eurocode 4: Design of composite steel and concrete structures – Part 1-1: General rules and rules for buildings	NA to BS EN 1994-1-1:2004 (UK National Annex to Eurocode 4: Design of composite steel and concrete structures – Part 1-1: General rules and rules for buildings) (2008)
BS EN 1995-1-1	Eurocode 5: Design of timber structures – Part 1-1: General – Common rules and rules for buildings	
BS EN 1995-1-2	Eurocode 5: Design of timber structures – Part 1-2: General – Structural fire design	
BS EN 1996-1-1:2005	Eurocode 6 - Design of masonry structures – Part 1-1: General rules for reinforced and unreinforced masonry structures	NA to BS EN 1996-1-1:2005 (UK National Annex to Eurocode 6 - Design of masonry structures – Part 1-1: General rules for reinforced and unreinforced masonry structures) (2007)
BS EN 1997-1:2004	Eurocode 7: Geotechnical design – Part 1: General rules	NA to BS EN 1997-1:2004 (UK National Annex to Eurocode 7: Geotechnical design – Part 1: General rules)
BS EN 1997-2:2007	Eurocode 7: Geotechnical design – Part 2: Ground investigation and testing	

3 GEOTECHNICAL DESIGN PARAMETERS

The following values have been taken from the ??? SI Report (TBC).

- SI included TBC
- Site Profile TBC
- The British Geological Survey (BGS) online map indicates that the sites bedrock geology is Margate Chalk Member. The sites superficial deposits are of Clay with flints formation, consisting of clay, silt sand and gravel.
- Concrete sulphate class Ds-1 and AC-1 required? TBC. Ground contamination TBC.
- Ground gases TBC

4 LOAD ACTIONS & COMBINATIONS

4.1 Ultimate Limit States (BS EN 1990:2002, Section 6.4)

Combinations of actions for persistent or transient design situations (BS EN 1990:2002, Cl. 6.4.3.2, Eq. 6.10):

$$\sum_{j\geq 1}\gamma_{G,j}G_{k,j}+\gamma_P P+\gamma_{Q,1}Q_{k,1}+\sum_{i\geq 1}\gamma_{Q,i}\psi_{0,i}Q_{k,i}$$

Combinations of actions for accidental design situations (BS EN 1990:2002, Cl. 6.4.3.3, Eq. 6.11a/b):

$$\sum_{j\geq 1}G_{k,j}+P+A_d+(\psi_{1,1} or \psi_{2,1})Q_{k,1}+\sum_{i\geq 1}\psi_{2,i}Q_{k,i}$$

4.2 Serviceability Limit States (BS EN 1990:2002, Section 6.5)

Characteristic combination used for irreversible limit states (BS EN 1990:2002, Cl. 6.5.3, Eq. 6.14a/b):

$$\sum_{j\geq 1}G_{k,j}+P+Q_{k,1}+\sum_{i\geq 1}\psi_{0,i}Q_{k,i}$$

Frequent combination used for reversible limit states (BS EN 1990:2002, Cl. 6.5.3, Eq. 6.15a/b)(i.e., temperature loads):

$$\sum_{j\geq 1}G_{k,j}+P+\psi_{1,1}Q_{k,1}+\sum_{i\geq 1}\psi_{2,i}Q_{k,i}$$

Quasi-permanent combination used for long-term effects and the appearance of the structure (BS EN 1990:2002, Cl. 6.5.3, Eq. 6.16a/b) (i.e., long-term deflections [for reinforced concrete floor framing] which include creep and shrinkage effects):

$$\sum_{j\geq 1}G_{k,j}+P+\sum_{i\geq 1}\psi_{2,i}Q_{k,i}$$

where:

$G_{k,j}$ = characteristic value of permanent action j (i.e., self-weight or superimposed dead load)
P = value of a prestressing action
A_d = design value of accidental action
A_{Ed} = E in load combinations below = design value of seismic action = $\gamma_I A_{Ek}$ where A_{Ek} is characteristic value of seismic action
$Q_{k,1}$ = characteristic value of leading variable action 1 (e.g., Live, Wind, Temperature, etc.)
$Q_{k,i}$ = value of accompanying variable action i

$\gamma_{G,j}$ = partial factor for permanent action j
$\gamma_{Q,1}$ = partial factor for leading variable action 1
$\gamma_{Q,i}$ = partial factor for accompanying variable action i

Ψ_0 = factor for combination value of a variable action
Ψ_1 = factor for frequent value of a variable action
Ψ_2 = factor for quasi-permanent value of a variable action

4.3 Partial Factors for ULS design situations

Per the UK NA to BS EN 1990:2002 Tables NA.A1.1, NA.A1.2 (B) (same as A1.2 (B)) and NA.A1.2 (C) (same as A1.2 (C)), the following factors will be applied:

Action	Ψ_0	Ψ_1	Ψ_2
Imposed loads in buildings			
Category A: domestic, residential areas	0.7	0.5	0.3
Category B: office areas	0.7	0.5	0.3
Category C: congregation areas	0.7	0.7	0.6
Category E: storage areas	1.0	0.9	0.8
Category F: traffic area ≤ 30kN veh wt	0.7	0.7	0.6
Category G traffic area >30kN veh wt ≤160	0.7	0.5	0.3
Category H: roofs	0.7	-	-
Snow alt <1000m	0.5	0.2	0
Wind loads on buildings	0.5	0.2	-
Temperature (non-fire) in buildings	0.6	0.5	-

For the design of structural members not involving geotechnical actions (Set B):

Permanent actions (unfavourable), $\gamma_{Gj,sup}$=1.35
Permanent actions (favourable), $\gamma_{Gj,inf}$=1.00
Partial factor for leading variable action, $\gamma_{Q,1}$ = 1.50 (where unfavourable, 0 where favourable)
Partial factor for accompanying variable action, $\gamma_{Q,i}$ = 1.50 (where unfavourable, 0 where favourable)

For the design of structural members involving geotechnical actions and resistance of the ground (both Set B and Set C in separate calculations, the most unfavourable):

Set B as above.
Set C:
Permanent actions (unfavourable), $\gamma_{Gj,sup}$=1.00
Permanent actions (favourable), $\gamma_{Gj,inf}$=1.00
Partial factor for leading variable action, $\gamma_{Q,1}$ = 1.30
Partial factor for accompanying variable action, $\gamma_{Q,i}$ = 1.30

4.4 Design Combinations

Ultimate Limit States (BS EN 1990:2002, Section 6.4) using partial factors for ULS design situations to the UK National Annex:

1.35D
1.35D+1.5L
1.35D+1.5T
1.35D+1.5L+0.9T
1.35D+1.5T+1.05L
1.35D+1.5W
0.9D+1.5W
1.35D+1.5L+0.75W
1.35D+1.5W+1.05L
1.35D+1.5W+1.05L+0.9T
1.35D+1.5L+0.75W+0.9T
1.35D+1.5T+1.05L+0.75W

Note: where L is a storage load and is not the leading variable 1.35L should be used in lieu of 1.05L

Serviceability Limit States (BS EN 1990:2002, Section 6.5) using partial factors for SLS design situations (UK National Annex):

1.0D
1.0D+1.0L
1.0D+1.0T
1.0D+1.0L+0.6T
1.0D+1.0T+0.7L
1.0D+1.0W
1.0D+1.0L+0.5W
1.0D+1.0W+0.7L
1.0D+1.0W+0.7L+0.6T
1.0D+1.0L+0.75W+0.9T
1.0D+1.0T+0.7L+0.5W
0.9D+1.0W

Note: where L is a storage load and is not the leading variable 0.9L should be used in lieu of 0.7L

Where D = dead load, L = live load (roof, floor or storage), W = wind load ($+W_x$, $-W_x$, $+W_y$, $-W_y$), T = temperature load.

Note: clause 3.3.2 of BS EN 1991-1-1:2002 states that imposed loads on roofs (L) need not be applied in combination with wind actions (W)

5 PERMANENT ACTIONS

The following values have been assumed for the purposes of this design and will need to be confirmed by the Architect before moving to the next stage of design. In the absence of detailed loading design criteria, the loads are based on experience on similar projects.

Tag	Description	Area	Uniform Load	Point Load
-	*Self-weight of structure*	*All*	*as calc.*	-
	GROUND FLOOR			
G1	*Ground Bearing RC Slab – as calc.* *75mm Screed – 1.50* *Floor Finishes – 0.20* *Water - depth x 10kN/m^3*	*Swimming Pool*	*1.70kN/m^2 + water load*	-
G2	*Ground Bearing RC Slab – as calc.* *125mm Screed – 3.00* *Floor Finishes – 0.20* *Floor Services (U/F Heating System) – 0.10*	*General Ground Floor, High Screed Levels*	*3.30 kN/m^2*	-
G3	*Ground Bearing RC Slab – as calc.* *Sprung Timber/Studio Floor System – 1.00*	*Sports Hall/Studio, Ground Floor*	*1.00 kN/m^2*	-
G4	*Ground Bearing RC Slab – as calc.* *75mm Screed – 1.50* *Floor Finishes – 0.20*	*General Ground Floor*	*1.70 kN/m^2*	-
	FIRST FLOOR			
G5	*130mm SMDTR60 0.9 Gauge Deck – as calc.* *Max 25mm Screed – 0.5* *Floor Finishes – 0.20* *Ceiling & Services – 0.30*	*Typical First Floor*	*1.00 kN/m^2*	-
G6	*130mm SMDTR60 0.9 Gauge Deck – as calc.* *Sprung Floor System – 0.75* *Ceiling & Services – 0.30*	*First Floor Studio*	*1.05kN/m^2*	-
G7	*130mm SMDTR60 0.9 Gauge Deck – as calc.* *125mm Screed – 2.50* *Floor Finishes – 0.20* *Ceiling & Services – 0.30*	*Typical First Floor, High Screed Levels*	*3.00 Kn/m^2*	-
	ROOF (Metal deck weight included where it is not part of a composite slab system)			
G8	*Steel Deck (Tata D100 0.9mm Gauge) – 0.15* *Roof Finishes – 0.15* *Ceiling & Services – 0.20*	*Typical Flat Steel Roof*	*0.50 kN/m^2*	-
G9	*130mm SMDTR60 0.9 Gauge Deck – as calc.* *Concrete Pavers – 1.50* *Roof Finishes – 0.15* *Ceiling & Services – 0.25*	*Roof Plant*	*1.90 kN/m^2*	-
G10	*PV Allowance – 0.20* *Deck(Tata Steel D159 1.25mm Gauge) – 0.20* *200mm Insulation – 0.050* *50mm Acoustic Insulation – 0.050* *Standing Seam External Roof– 0.050* *Services – 0.10*	*Sports Roof with PV Panels*	*0.65 kN/m^2*	-
G11	*PV Allowance – 0.20* *Deck(Tata Alu D159 1.5mm Gauge) – 0.10* *200mm Insulation – 0.050* *50mm Acoustic Insulation – 0.050* *Standing Seam External Roof – 0.050* *Services – 0.10* *Timber Soffit Panels – 0.15*	*Swimming Roof with PV Panels & Timber Soffit*	*0.70 kN/m^2*	-

6 VARIABLE ACTIONS

The following values have been assumed for the purposes of this design and will need to be confirmed by the Architect before moving to the next stage of design. In the absence of detailed loading design criteria, the loads are based on experience on similar projects.

Tag	Area	Uniform Load	Point Load
Q1	*Ground Floor Plant*	*10.0 kN/m^2*	*9.00 kN*
Q2	*Sports Hall, Gymnasia, Studios & Roof Plant*	*5.0 kN/m^2*	*4.50 kN*
Q3	*Typical Floor*	*3.0 + 1.0 kN/m^2*	*4.50 kN to Corridors, 2.70 kN otherwise*
Q4	*Typical Flat Steel Roof*	*0.60 kN/m^2*	-
Q5	*Sports & Swimming Hall Roofs*	*0.40 kN/m^2*	-
Q6	*Swimming Pool Surrounds*	*4.0kN/m^2*	*4.50 kN*

Notes: 1. Categories per NA to BS EN 1991-1-1:2002.

7 WIND LOADING & SNOW LOADING

7.1 Wind Loading & Snow Loading

The following values have been assumed for wind loading.

Parameter	Value	Reference
v_{bmap}	21.5m/s TBC	BS EN 1991-1-4 UK NA (Figure NA.1)
c_{alt}	1.12	BS EN 1991-1-4 UK NA (NA.2.5, A = 120m)
c_{prob} (60 years)	1.01	
q_b (worst case based on c_{dir}=1.0)	0.360 kN/m^2	BS EN 1991-1-4 (Figure A.NA.2)
q_p **(Westerly wind direction)** (at max building height)	0.860 kN/m^2	BS EN 1991-1-4 (Figure A.NA.2)

The following values have been assumed for snow loading:

Area	Value	Reference
Zone number	3	BS EN 1991-1-3 UK NA (Figure NA.1)
Typical Roof (Pitch 0-30^o, un-drifted)	0.43 kN/m^2	BS EN 1991-1-3 Table 5.2 (μ_1 = 0.8)

8 PARAPETS / HANDRAILS LOADING

8.1 Parapets/Handrails Loading

Feature	Line Load	Reference
All parapets, balustrades balconies: Category A (ii) (conservative loading, for robustness of structure)	0.74 kN/m^2	BS EN 1991-1-1 UK NA (Table NA.8)

9 STABILITY & ROBUSTNESS

9.1 Stability Overview

TBC

9.2 Robustness

In accordance with Building Regulations Approved Document A – A3 Disproportionate collapse:
Building Class: Section 5 - Table 11: The structure is defined as a **consequence class 1 structure**.
Detailing of the building will be undertaken as per a consequence class 2B building.

9.3 Design Tie Forces

Parameter	Value	Reference
CLT panel – CLT panel and CLT panel – RC ground floor structure, Horizontal tie force (applied as shear along panel length or across panel length)	Internal Ties - $F_{t,hor,int,d}$ = max{15 or 0.8(g_k + q_k)sL} (kN) Perimeter Ties - $F_{t,hor,per,d}$ = max{7.5 or 0.4(g_k + q_k)sL} (kN)	Structural Timber Association – 5. Structural Timber Engineering Bulletin: *Timber frame structure – platform frame construction (part 3)*, Table 3

10 PARAPETS / HANDRAILS LOADING

10.1 Deflection Limits

The following deflection criteria have been assumed in the design:

Area	Limit
Vertical Deflection: Typical Floors (beams and slabs) Typical Roof (Tiled)	Lesser of: Span/250 under total loading Span/360 post-construction movement 20mm post-construction movement for areas with partitions
Vertical Deflection: Flat Roof	Lesser of: Span/150 under total loading Span/250 post-construction movement 20mm post-construction movement for areas with partitions
Horizontal Deflection Glazed/Stone Clad/Rendered Walls	Height or Span/500 (or 14mm if less)
Horizontal Sway/Storey Structural Frames	Height/300 (per storey)

Notes: SLS deflections assessed under characteristic dead and imposed loads in accordance with BS EN1990.

11 FLOOR VIBRATION

11.1 Vibration Criteria

Floor vibration to be evaluated per, Floor Vibrations Due to Human Activity in conjunction with the Steel Construction Institute (SCI) P354 'Design of Floors for Vibration'

For Steelwork
General Areas
Typical floors and corridors are designed for an element frequency limit of 5Hz and a combined system frequency limit of 4Hz.

Studio & Party Room
Studios and the Party Room are designed for an element frequency limit of 8Hz and a combined system frequency limit of 8.4Hz.

12 FIRE RESISTANCE

12.1 Fire Resistance

The following fire resistance periods have been assumed in design based on the architect's specifications. TBC by Fire Engineer.

Area	Minimum fire period of resistance
Floors	60mins
Roofs	30mins
Beams/Columns/Walls supporting roof only	30mins
Beams/columns/walls supporting floors	60mins

The strategy for the design of structural elements for the given minimum fire period of resistances is summarised below.

Element	Value	Method	Alternative
Roofs	R(30), EI(0)	Inherent in CLT floor panel	N/A
Beams/Columns/Walls supporting roof only	R(30), EI(0)	Inherent in CLT/Glulam member	All fire protection provided by plasterboard finishes

Notes:

1. It is assumed that all steel structures, where supporting fire rated floors or roofs, are to be fire protected by fire board protection or intumescent paint.
2. It is assumed that plasterboard finishes do not generally contribute to fire resistance of timber elements.
3. All CLT panels are designed for fire on one side only. Should protection be required on both sides this should be established by the architect who should design and specify additional boarding or other protection.

13 TEMPERATURE & HUMIDITY EFFECTS

13.1 Fire Resistance

The effect of temperature and humidity will have an influence on the structural elements. When considering these effects it should be noted that the external temperature will not in all cases directly influence structural elements and the sheltering and insulating of elements should be considered.

The effects of differential thermal movement should also be considered not just for elements with different thermal coefficients but also for similar elements partially insulated by varying amounts to temperature change effects.

Temperature ranges
The following temperature ranges should be considered:
• Internal elements: 5°C to 25°C
• External elements: -10°C to 40°C
• Plant rooms: -10°C to 40°C

In the absence of further information 3/4 of this temperature range should be considered for free expansion and contraction of elements.

14 MOVEMENT & TOLERNACES

14.1 Movement & Tolerances

This section outlines the movements and tolerances of the structural elements of the development that could reasonably be expected during the frame life. This section should be used by the Architect, MEP, Main and Trade Contractors to understand the initial fit and behaviour under loading of the primary structural elements such as beams, columns, decking, floor plates and load bearing walls.

Some of the materials that make up the structural elements such as steel, concrete and other metals have properties that are well understood and established over a narrow range. The interaction of the structure with elements such as floor finishes, cladding and internal partitions, that, although not designed to stiffen structural elements, may never the less stiffen in an unpredictable and unreliable manner the span of slabs and beams etc or the sway of columns and walls.

Connections of elements is another area where unpredictable effects may take place and elements tend not to behave elastically in these locations causing discontinuities across the connection which should be considered for interfacing elements. Indeed many simply supported beams and slabs are deliberately designed to rotate at end connections and this effect should be noted for interfacing beams.

The net results of all the above effects is that although limits can be established for the range of movement of structure under applied loads, the actual deflection or movement is not predictable and may vary from place to place in the structure even for similar elements under similar load conditions. Consideration should be given to the effects if deflection etc did not happen to one element but happened to another.

14.2 Construction Tolerances

The following should be considered. The sources of tolerance include:
- Setting out, Erection, Fabrication manufacture
- Movement joints in cladding where noted on GA and sections, typically +/- 25mm.

15 CONCRETE

The concrete grades used for design are listed in below:

Concrete Grade Section
> Grade 32/40 ~ Composite Metal Decks (fcu =25 N/mm2) - All concrete metal decks
> Grade RC40 / GEN3 ~ C32/40 (fcu = 40 N/mm2) - All foundations, retaining walls, ground beams and ground bearing slabs

Concrete Material Properties:
Material Property Grade C32/40
Young's Modulus, E = 33.35 kN/mm2
Poisson's Ratio, v = 0.2
Co-efficient of thermal expansion, 1.0 x 10 −5 per oK
Shear Modulus, G = 13.9 kN/mm2

16 STEEL

The design, details, fabrication and erection of structural steelwork shall be in accordance with BS EN 1993-1-1: 2005: Eurocode 3: Design of steel structures. Structural steel shall be Grade S355 unless noted otherwise (UNO).

Form	Material	Tolerances
Universal Beams and Columns	BS EN 10025	BS EN 10034
Joists		BS EN 10024
Channels		BS EN 10279
Angles		BS EN 10056-2
Rolled Tees		
Plates		BS EN 10029
Flats		BS EN 10029
Hollow sections (hot finished), Typ., U.N.O.	BS EN 10210-1 For weathering steels: BS 7668	BS EN 10210-2
Hollow sections (cold formed)	BS EN 10219-1	BS EN 10219-2
Galvanised open sections and strip	BS EN 10147	BS 2989
Ordinary bolt assemblies	Property classes 8.8: Full-threaded bolts to BS EN ISO 4017 (s/s BS 3692) Part-threaded bolts to BS EN 4014	Bolts: BS EN ISO 4018 or 4016 (s/s BS 4190) Nuts: BS EN ISO 4034
	BS 4395	
Holding down (foundation) bolt assemblies	Bolts to BS 7419 Nuts to BS EN ISO 4032 Washers to BS EN 7091	
Welding consumables	BS EN 756:2004 BS EN ISO 14171:2010 tbc BS EN 760:1996 BS EN ISO 2560: BS EN ISO 14341: BS EN ISO 17632: BS 639 BS 2901-1 BS 4165:1984 BS 7084	
Shear studs (headed)	BS EN ISO 13918 min f_y=350 N/mm^2	
Profiled steel sheeting for composite slabs	BS EN 1993-1-3, Sections 3.1 and 3.2 Steel per BS EN 10025 Cold-formed steel sheet per BS EN 10149-2 or -3 Galvanised steel sheet per BS EN 10326 Nominal thickness t=0.70mm	

16.1 Steel Properties

Density:	7,850 kg/m^3
Young's Modulus:	E = 210,000 MPa
Poisson's Ratio:	υ = 0.30
Coefficient of linear expansion:	α_T = 12x10^{-6}/°C (per BS EN 1991-1-5:2003 Table C.1)

16.2 Welding Electrodes

Consumables for use in metal arc welding shall comply with BS EN 756 (or BS EN ISO 14171 tbc), BS EN 760, BS EN ISO 2560, BS EN ISO 14341, or BS EN ISO 17632 as appropriate. These standards will be added to those in QCS 2007 Section 16 Part 5 (Welding).

Consumables used for completing welding of steels to BS EN 10025-5 shall have a weather resistance at least equivalent to the parent metal.

17 TIMBER

1. All structural timber will be service class 1 (inside insulation and vapour barrier), including the pool area where specific climate control is to be provided (by others).
2. CLT to be TBC
3. Glulam frame members are specified as TBC

18 SWIMMING POOL CONSTRUCTION

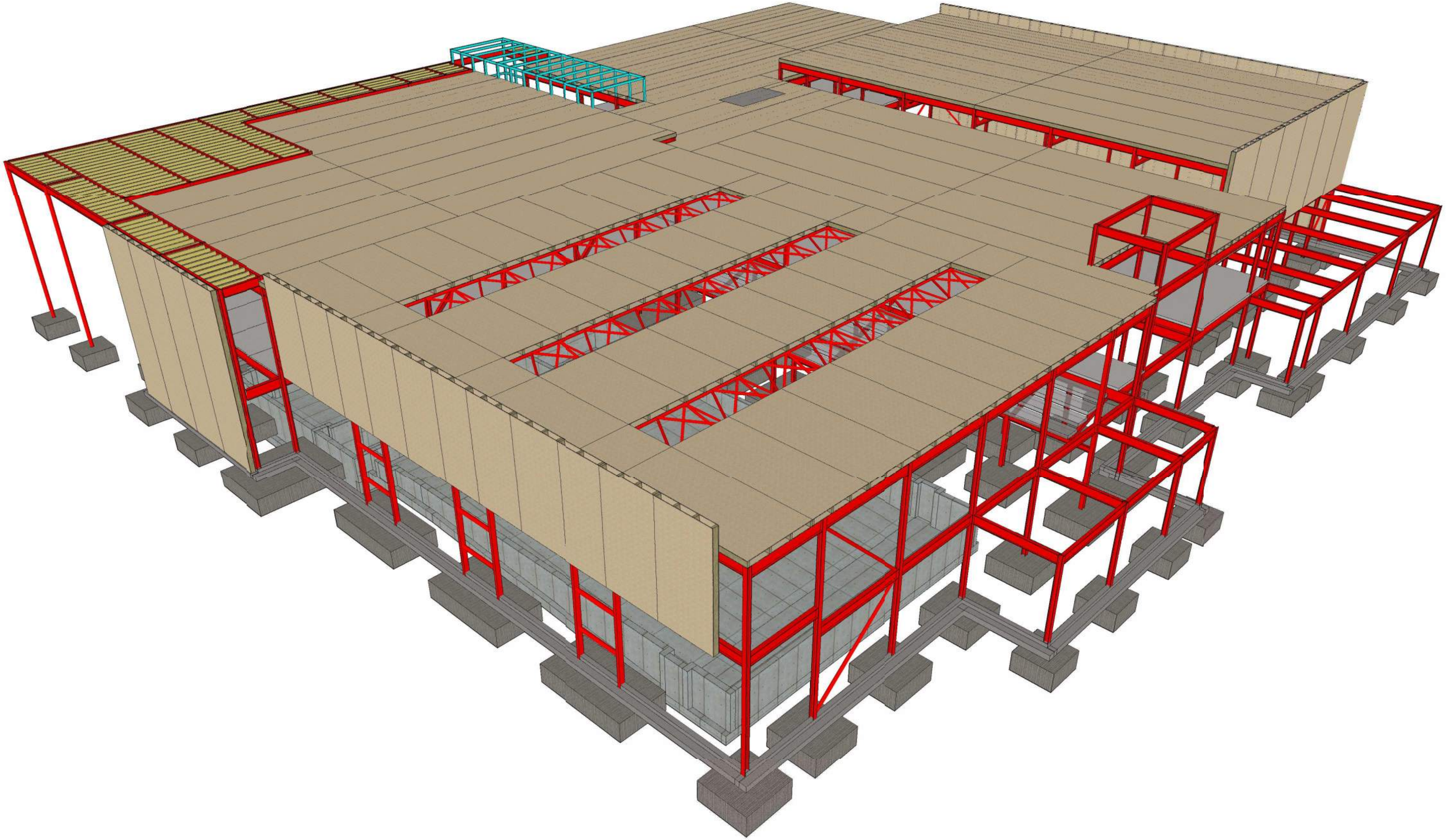
TBC

19 DRAINAGE & HARDSTANDING

TBC

APPENDIX B

STRUCTURAL ENGINEERING SKETCHES



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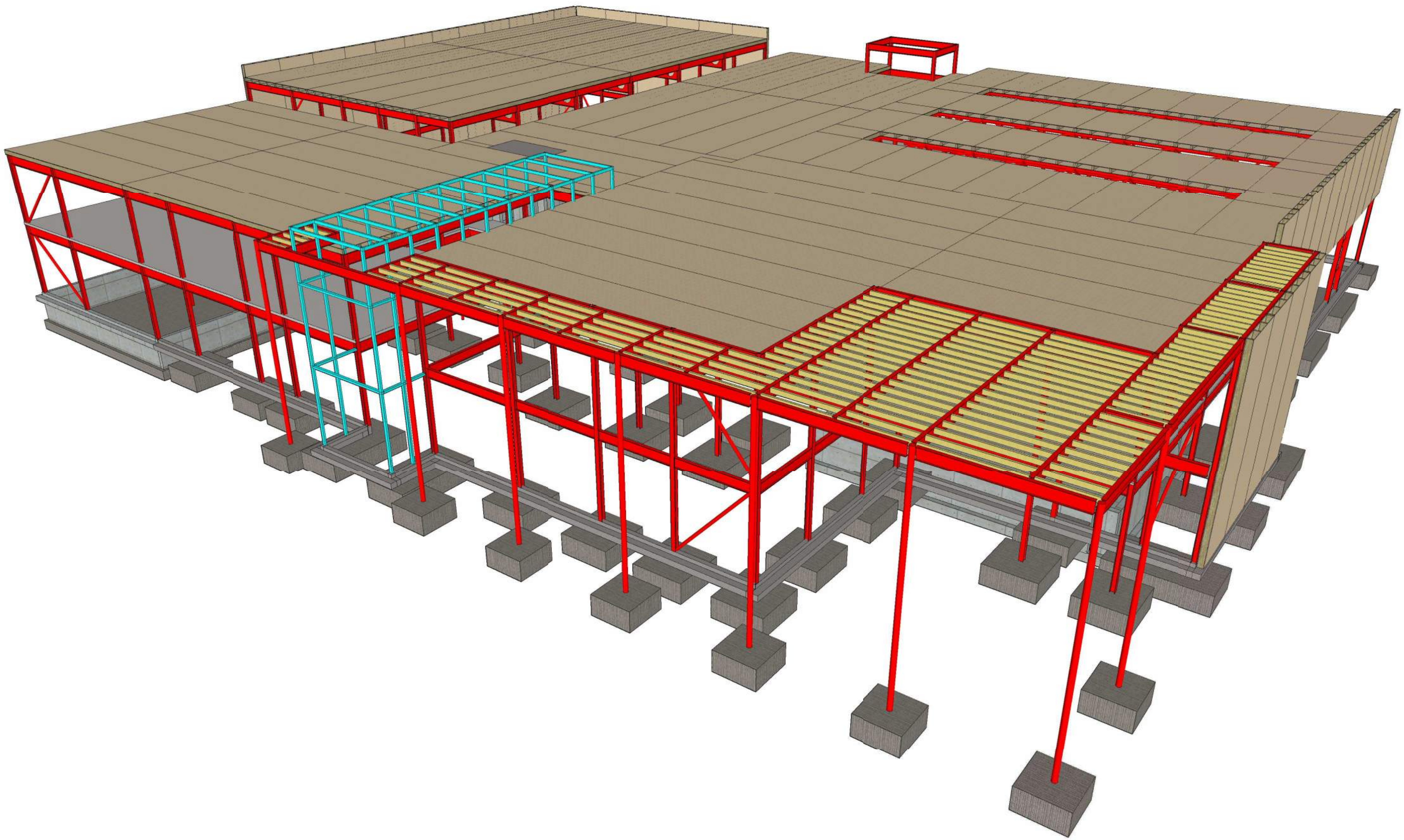

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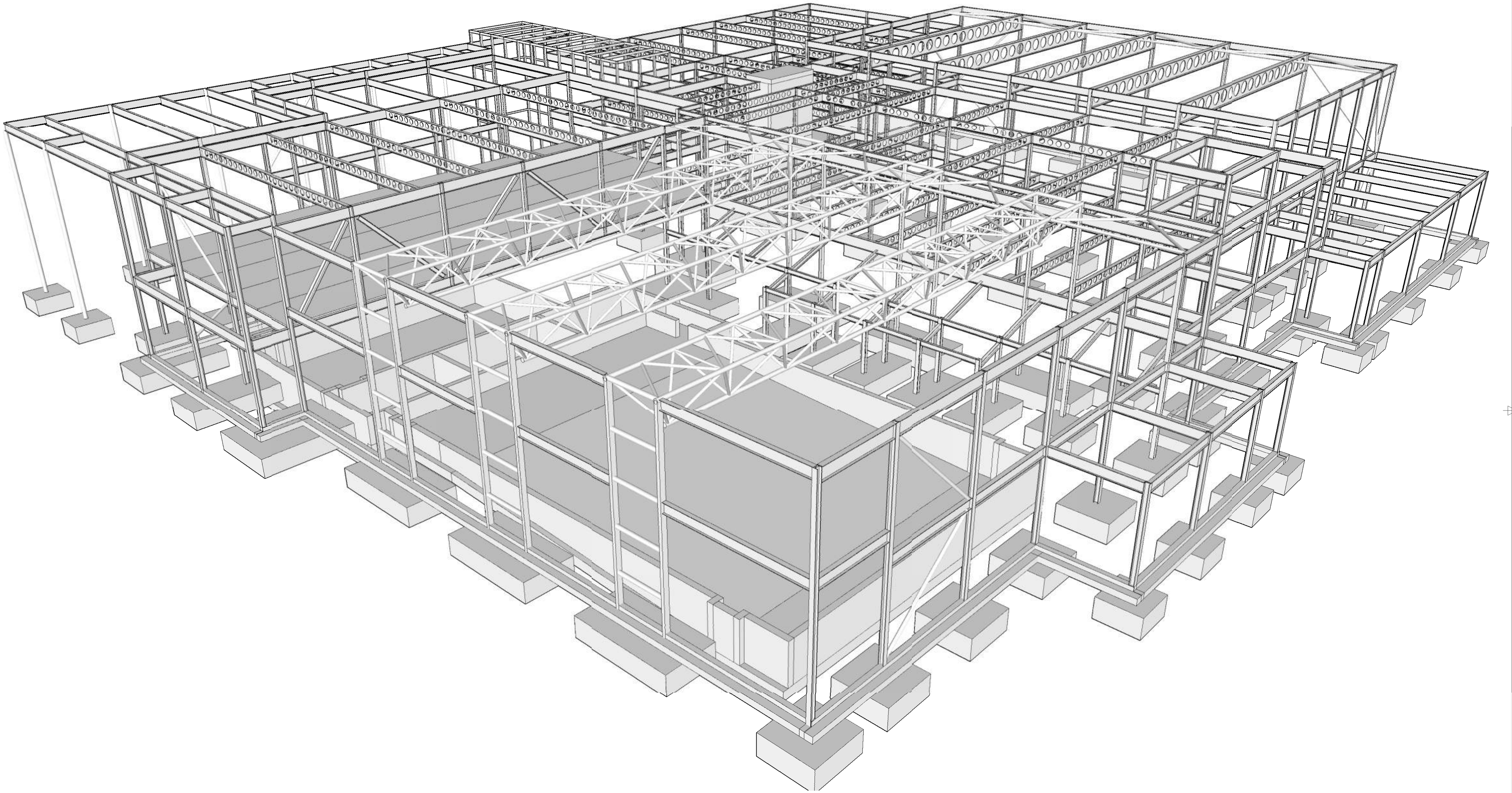

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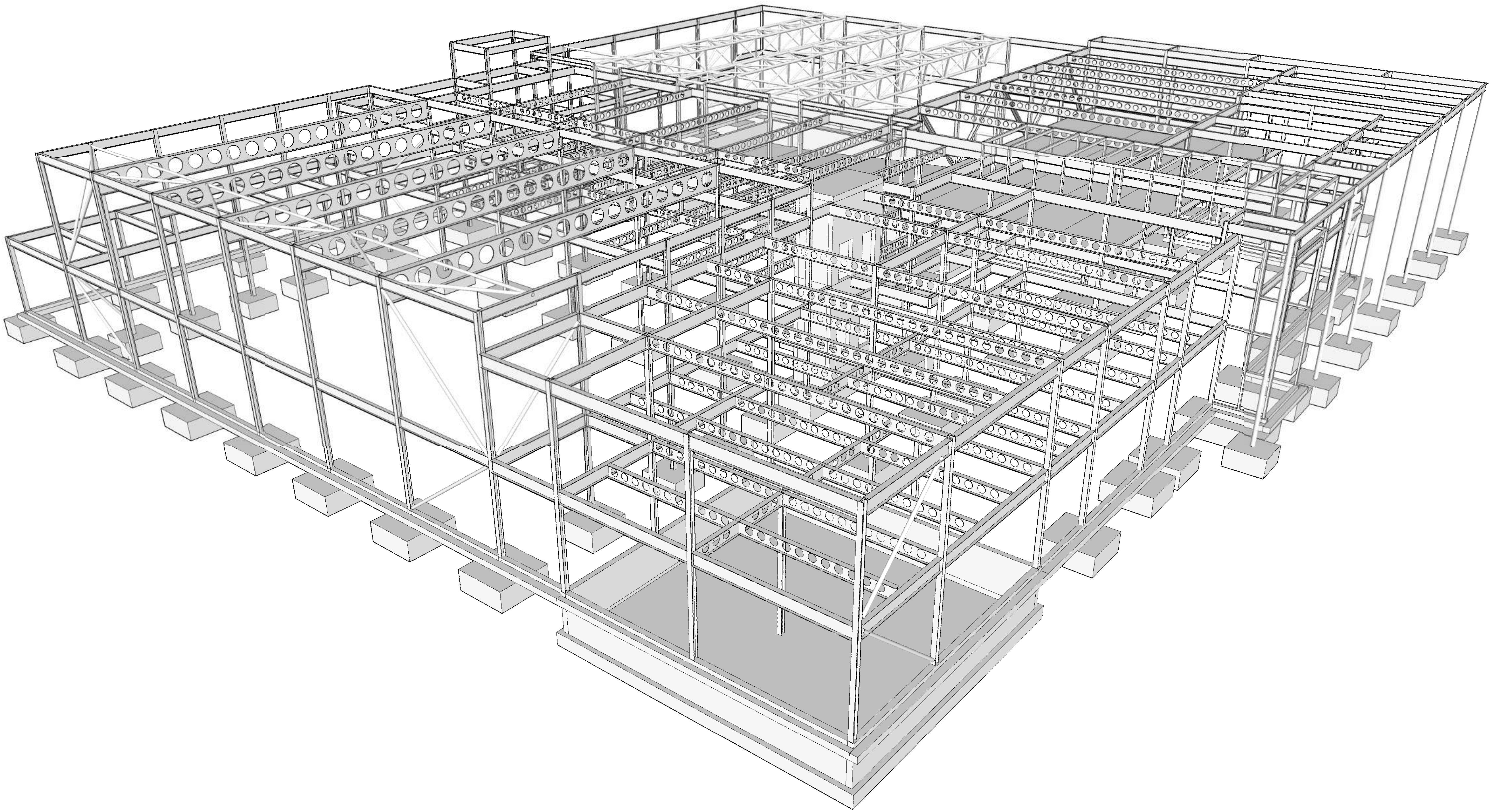

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www.engenuiti.com

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DRAWING TITLE: 3D VISUAL SHEET 4

SCALE: NTS

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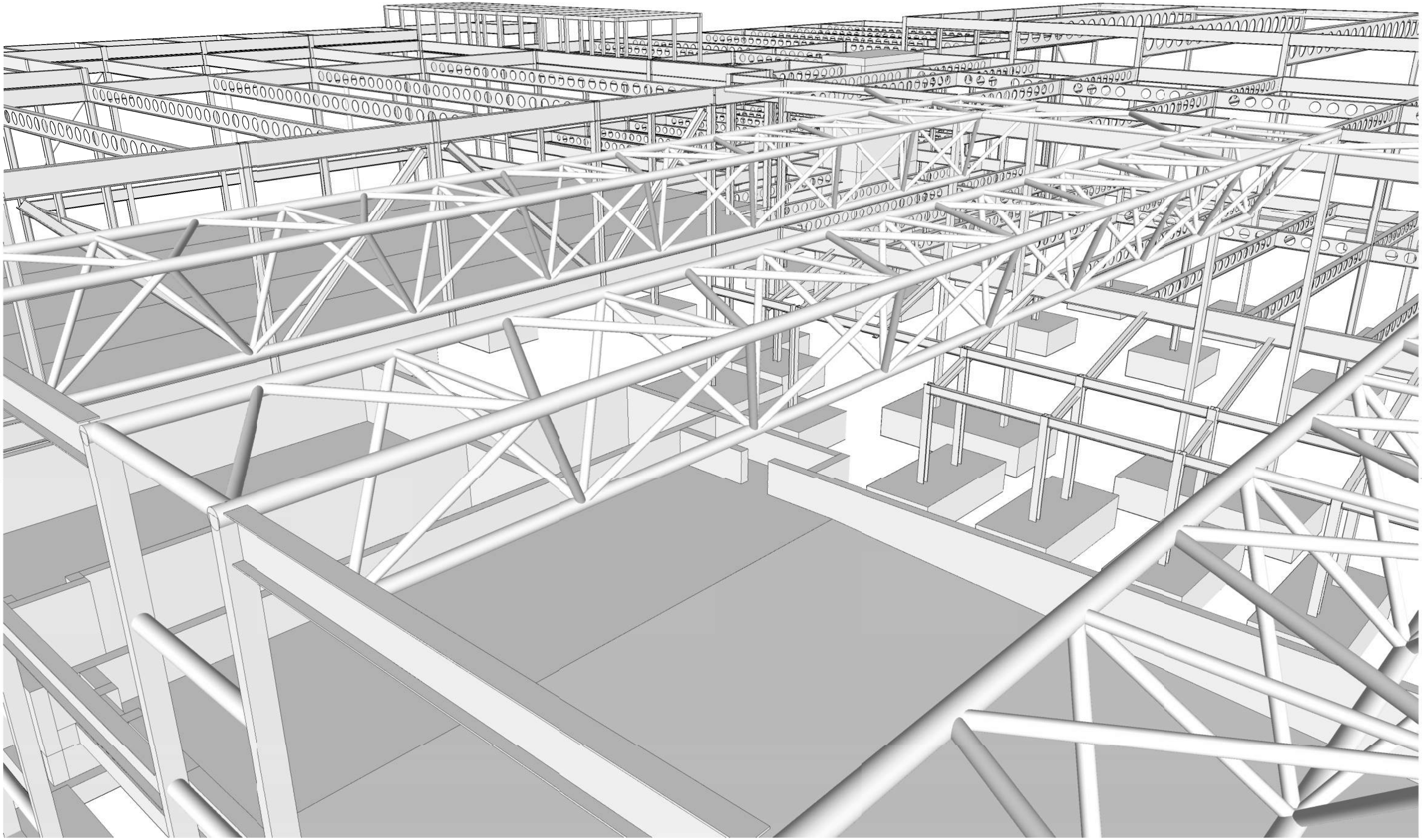

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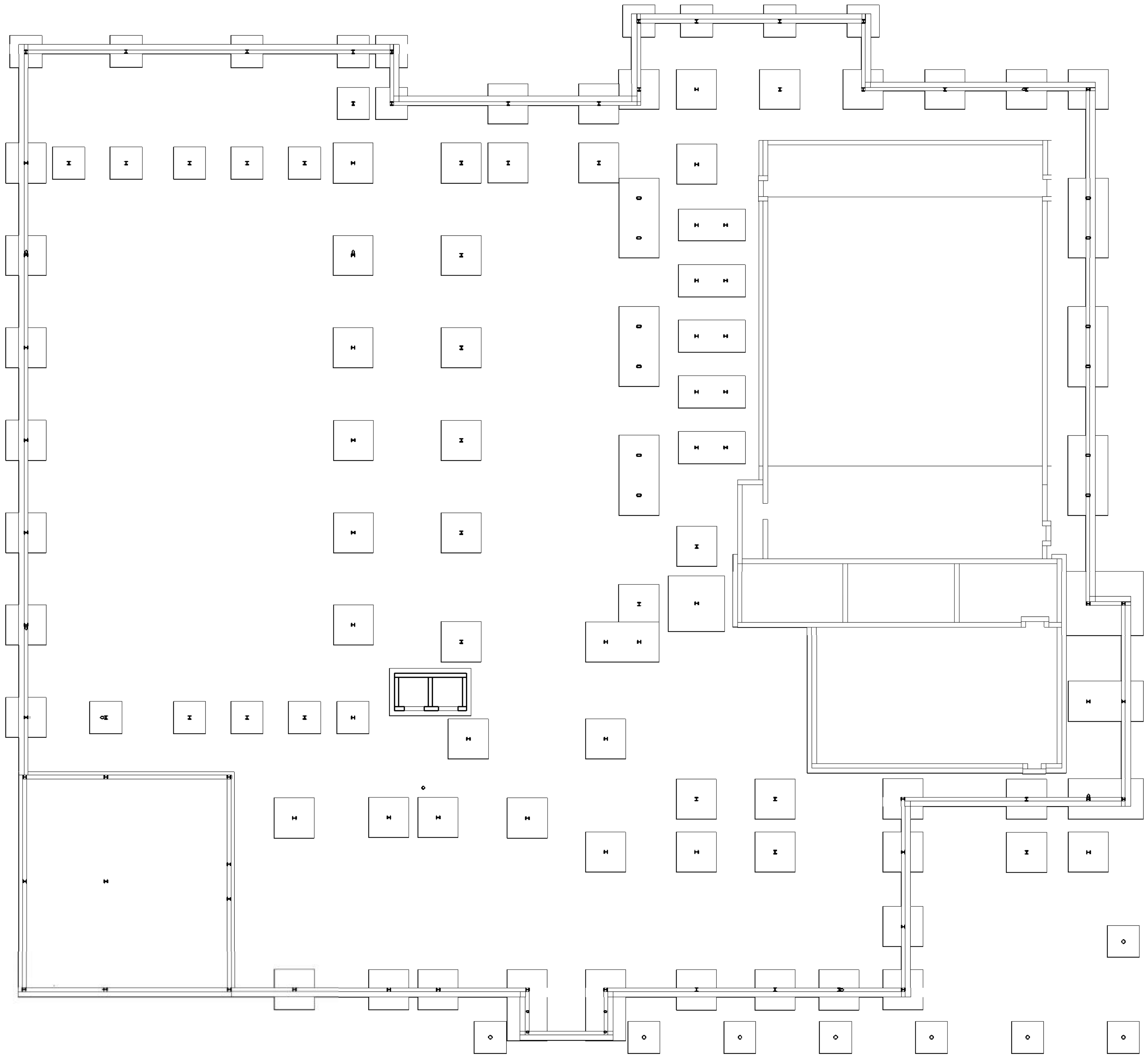

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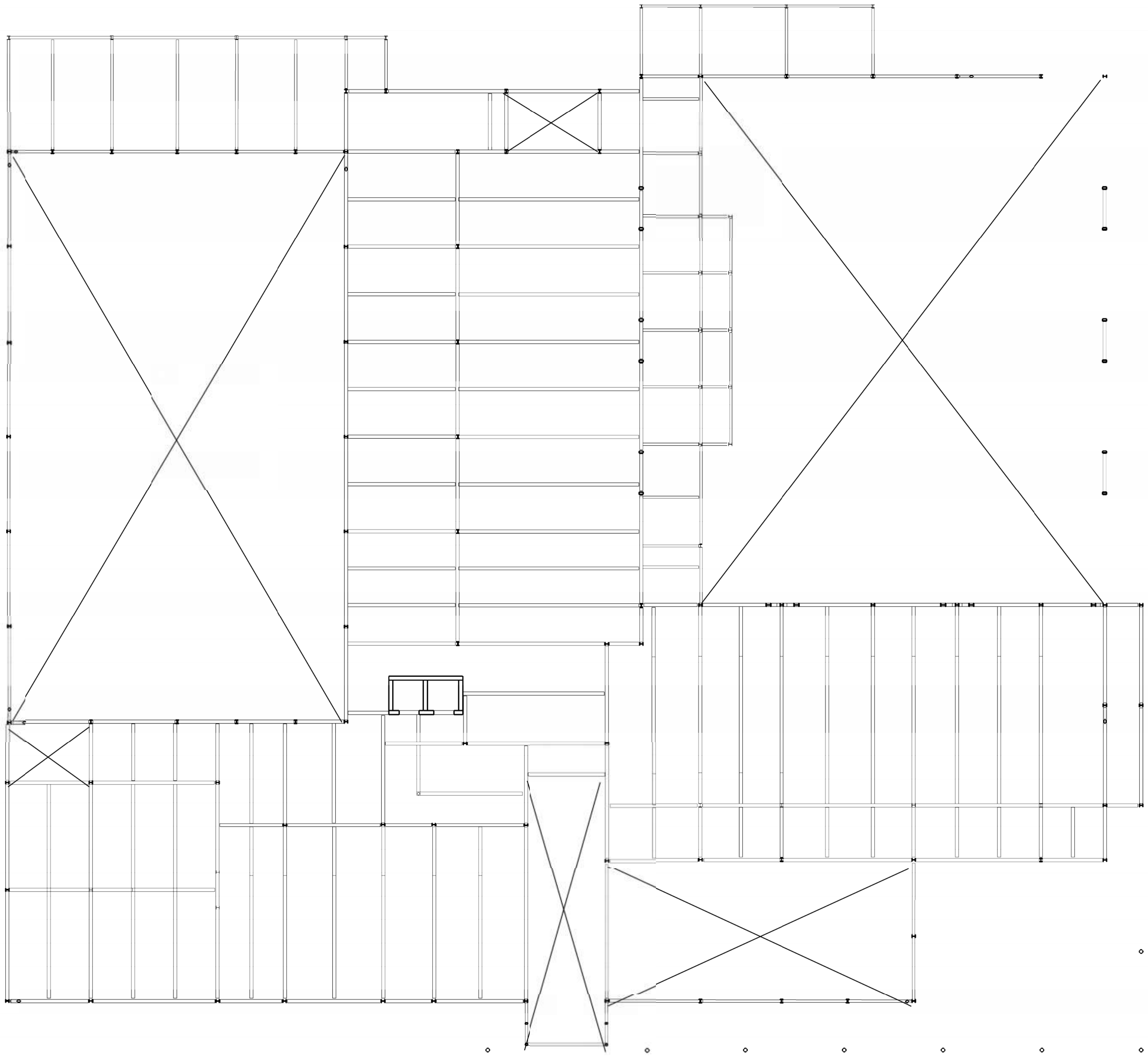

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DRAWING TITLE
FIRST FLOOR PLAN

SCALE
NTS

DATE
17.06.16

PROJECT NUMBER
634

DRAWING No
634-SK-S-110

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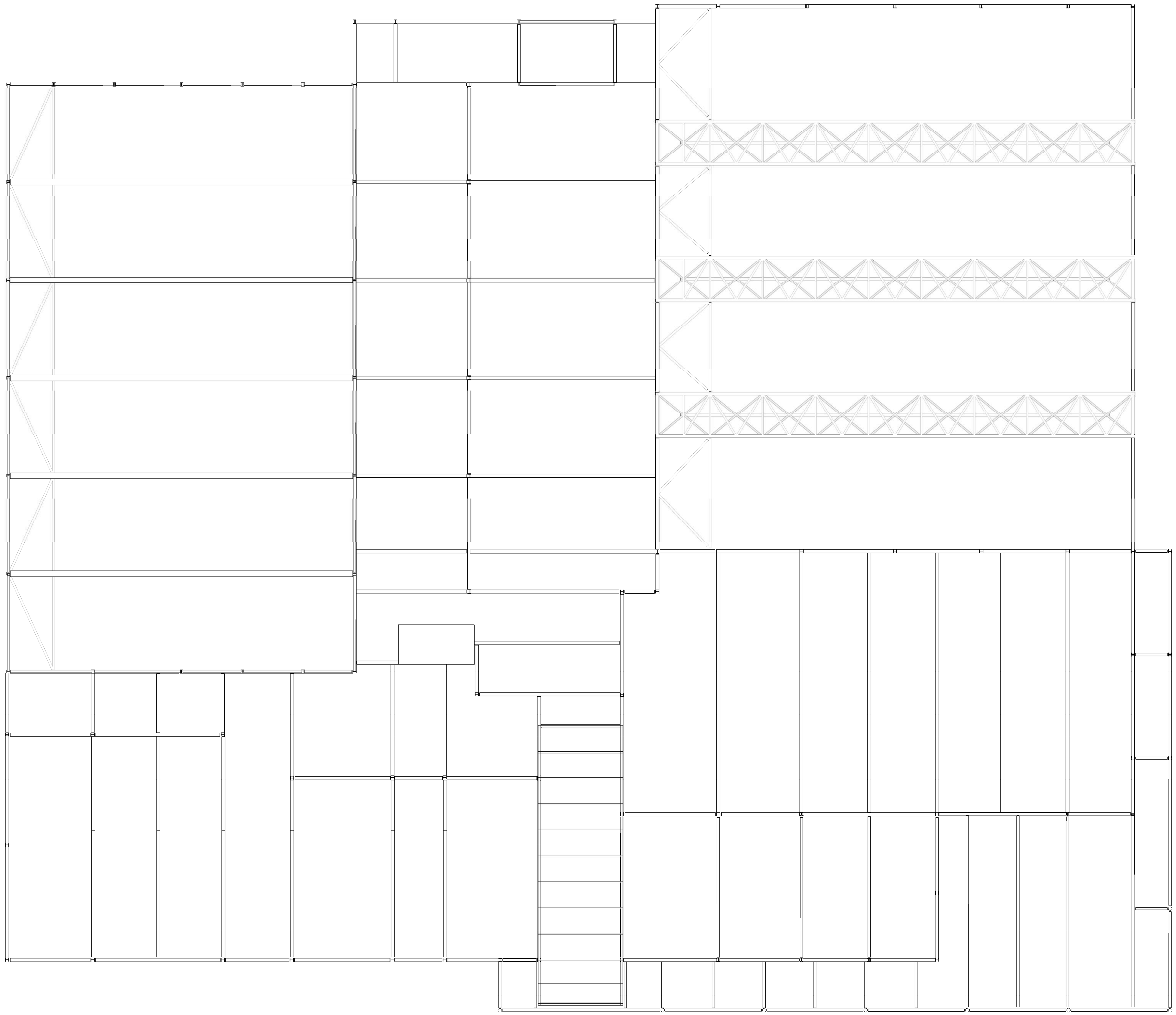

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DATE
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634-SK-S-120

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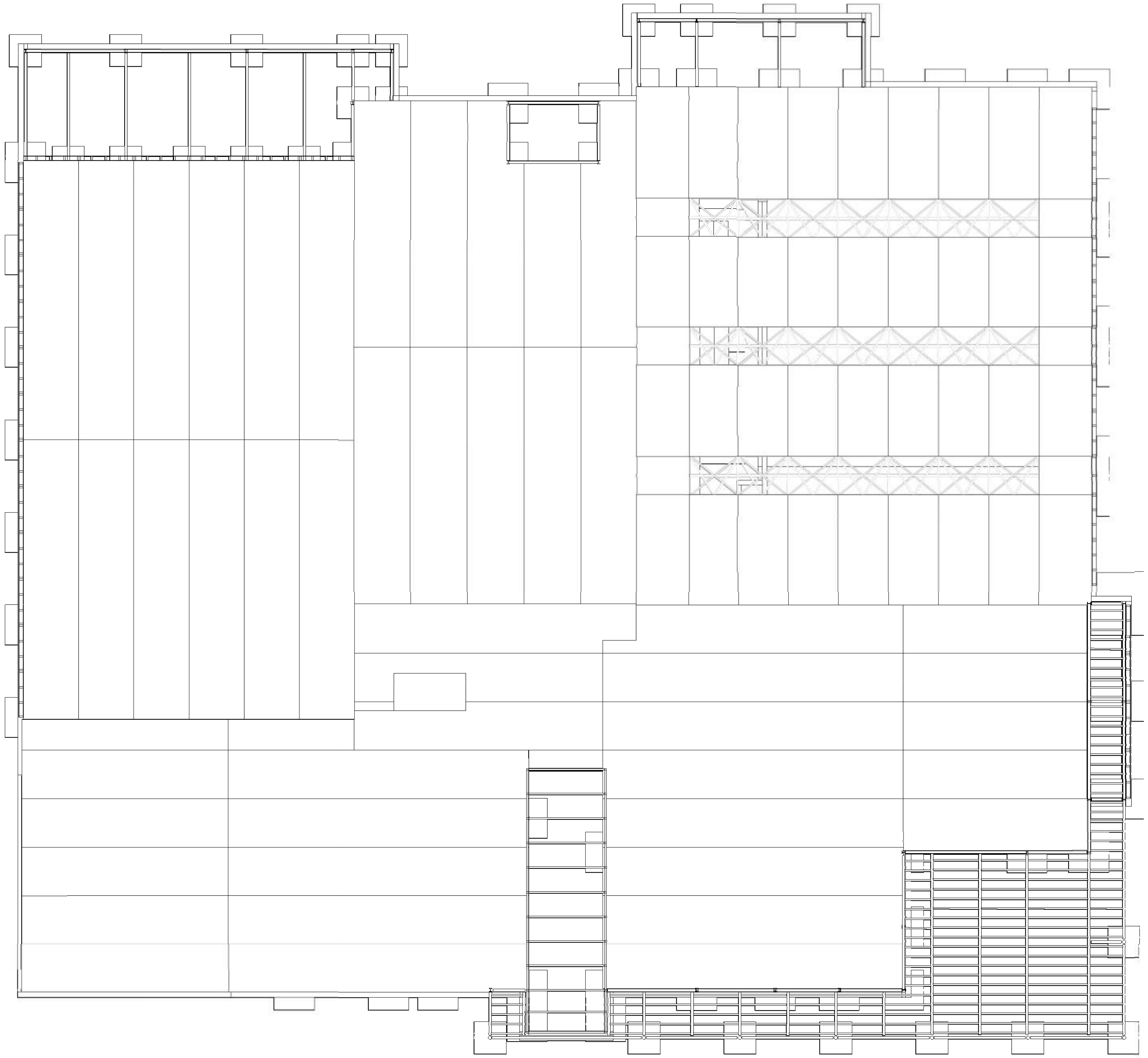

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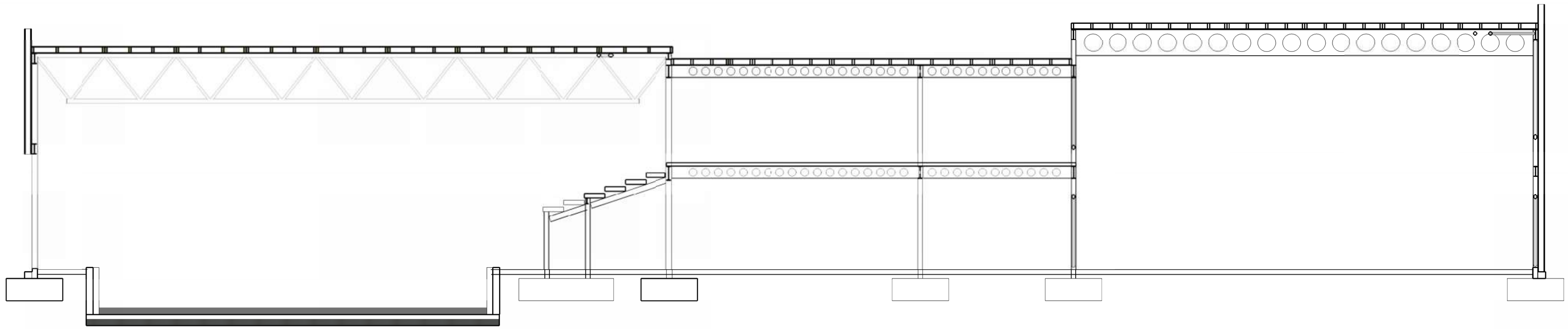

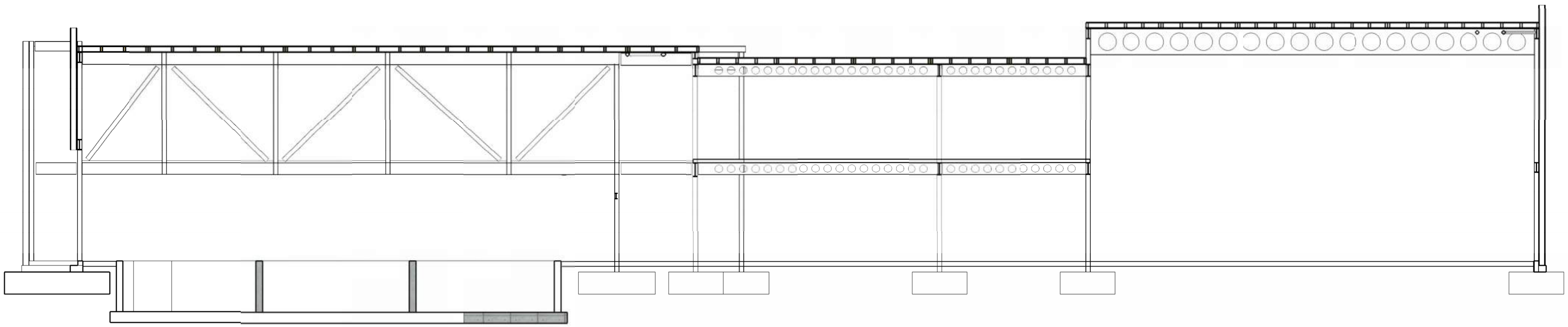

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DRAWING TITLE: BUILDING SECTION 1 & 2

SCALE: NTS

DATE: 17.06.16

PROJECT NUMBER: 634

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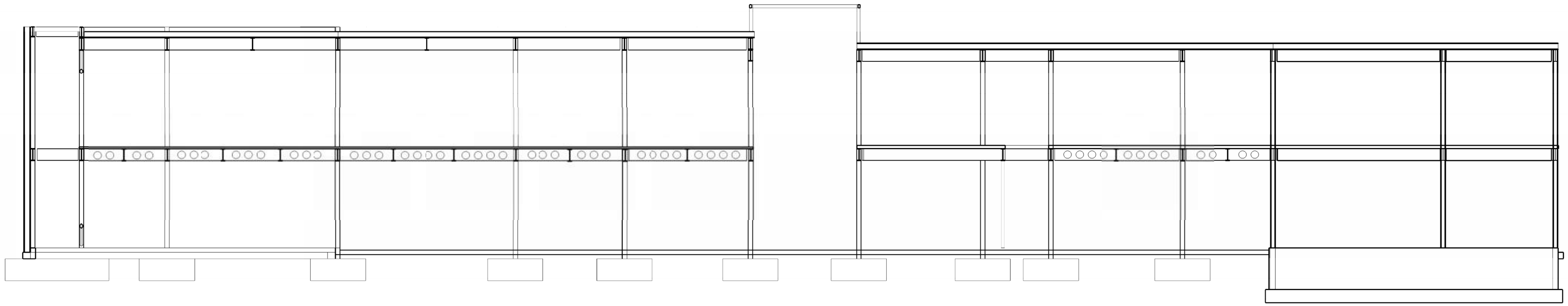

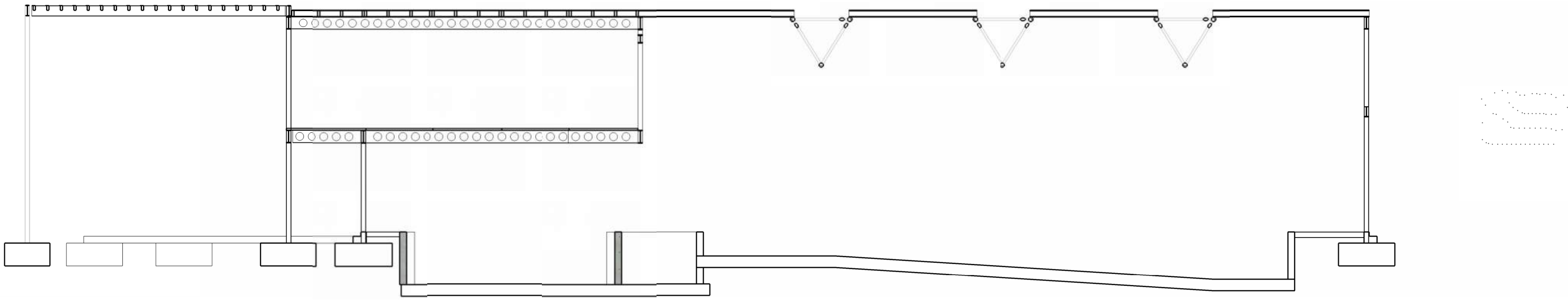

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DRAWING TITLE: BUILDING SECTION 3 & 4

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PROJECT NUMBER: 634

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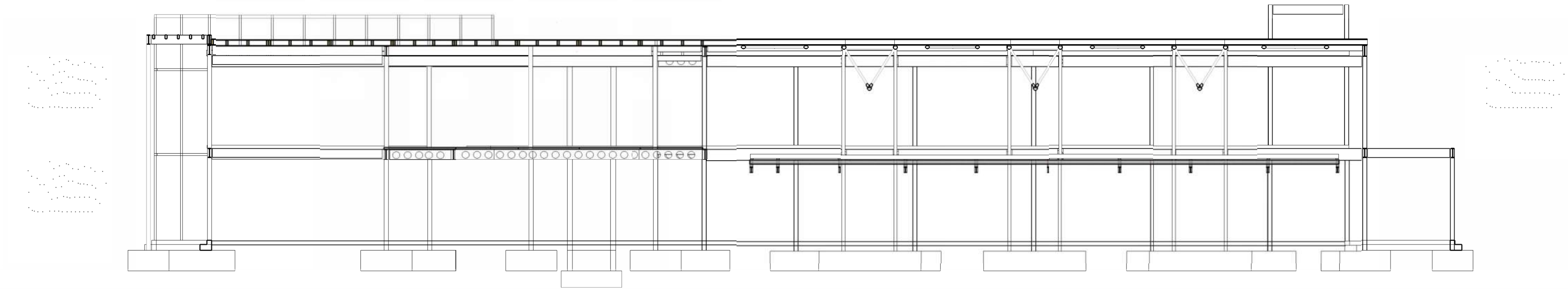

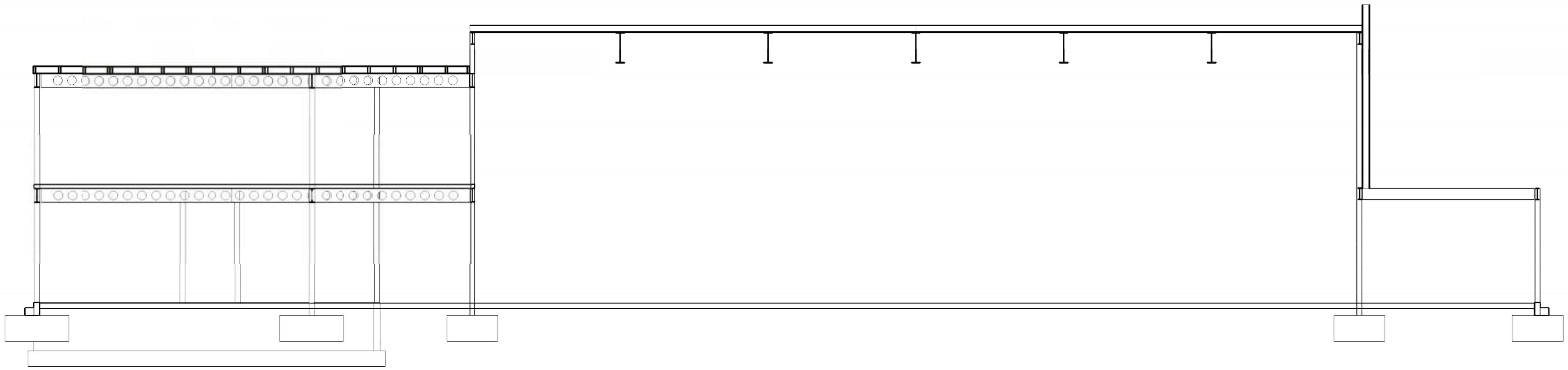

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DRAWING TITLE
BUILDING SECTION 5 & 6

SCALE
NTS

DATE
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PROJECT NUMBER
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DRAWING No
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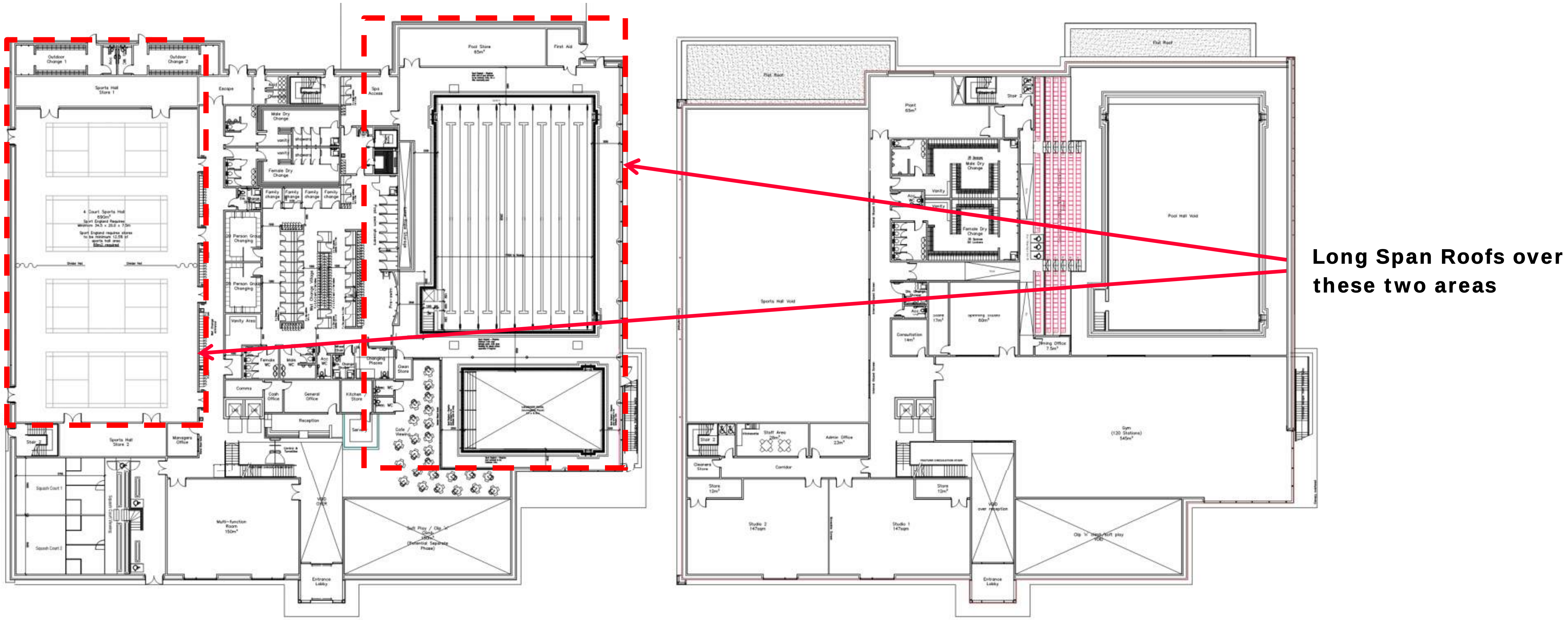
APPENDIX C

LONG SPAN ROOF STUDIES

Long Span Roof Studies

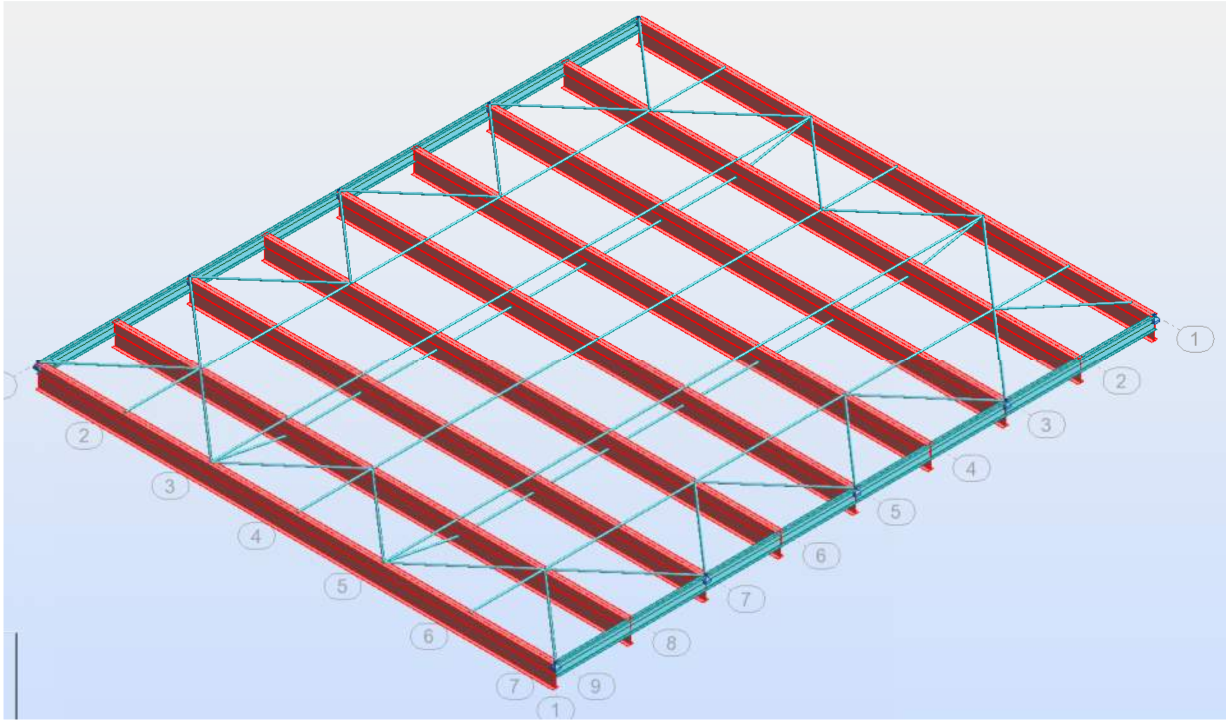
Introduction

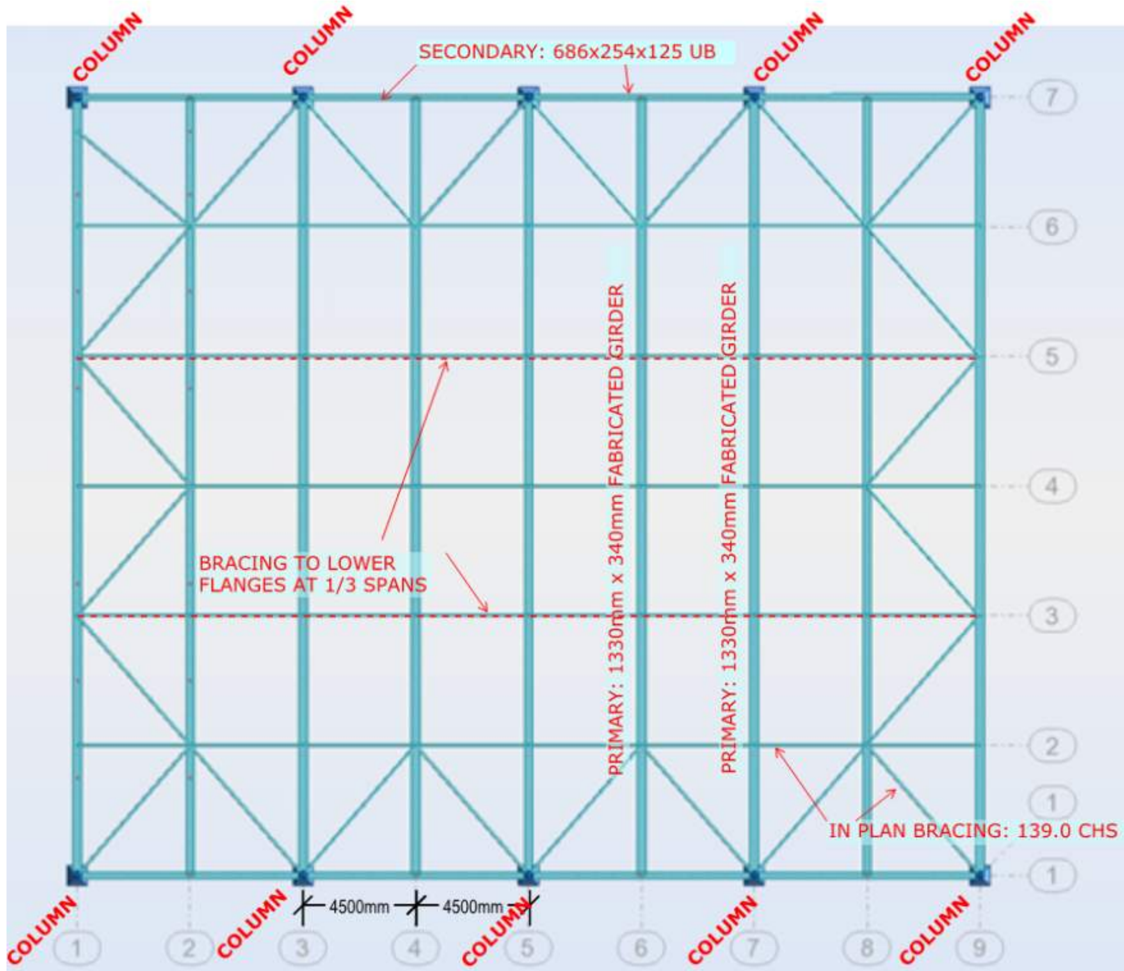


- This study aims to explore possible structural arrangements to the long-span roofs over the swimming pool and sports hall.
- This report explores the various options for roof beam arrangements, suitable roof decks and columns grids. The combinations of these parameters presented are not an exhaustive list – there are many more permutations.
- Alternative arrangements could be developed with column/beam spacings and roof decks varied.
- The study is based on the roof over the swimming pool (the larger of the two roofs) and thus can also be applied to the sports hall
- Five roof variants (A-E) of primary beam options are presented, each combined with a suitable column grid and roof deck option.
- Various column grids are considered along the main facades, with columns either at 7.2m or 9.0m centres.
- Long span beams are considered at both 7.2m and 4.5m spacings.
- Timber and trussed roofs have been proposed with CLT roofs which are heavier than steel versions and thus increase overall roof weight.
- Estimated quantities and weights for the whole roof (excluding columns) are given for initial guidance. Further studies would be required to refine these estimates and chose final configurations.
- To limit the potential for wind flutter, a limit of 2Hz has been placed on the natural frequency of long-span roofs. This is an onerous requirement and further refinement of this area would aim to lighten the roof and allow slightly shallower structural zones.
- Use of pre-cambering is not considered at this stage.
- Beams/Trusses have been designed to be stable during construction.

Long Span Roof Studies

Variant A – Fabricated Steel Girder





BEAM SPAN: 31.0m

COLUMN SPACING: 9.0m

PRIMARY BEAM SPACING: 4.5m

PROPOSED ROOF SLAB: METAL DECK ON PURLINS
(ELEMENT LENGTH: 9m – DOUBLE SPAN)

DESIGN CRITERIA

<u>LOADING</u>

SW	AS CALCULATED
Gk (SID)	DECK (0.35), FINISHES (0.25), SERVICES (0.25): 0.85 kN/m^2
Qk (ROOF)	0.60 kN/m^2
Qk (SNOW)	0.60 kN/m^2
Qk (WIND)	+0.20/-0.75 kN/m^2

<u>SERVICABILITY LIMITS</u>

DEFLECTION (TOTAL):	SPAN/150
DEFLECTION (POST CONSTRUCTION):	SPAN/250
VIBRATION (WIND):	2Hz MIN

MATERIAL QUANTITIES

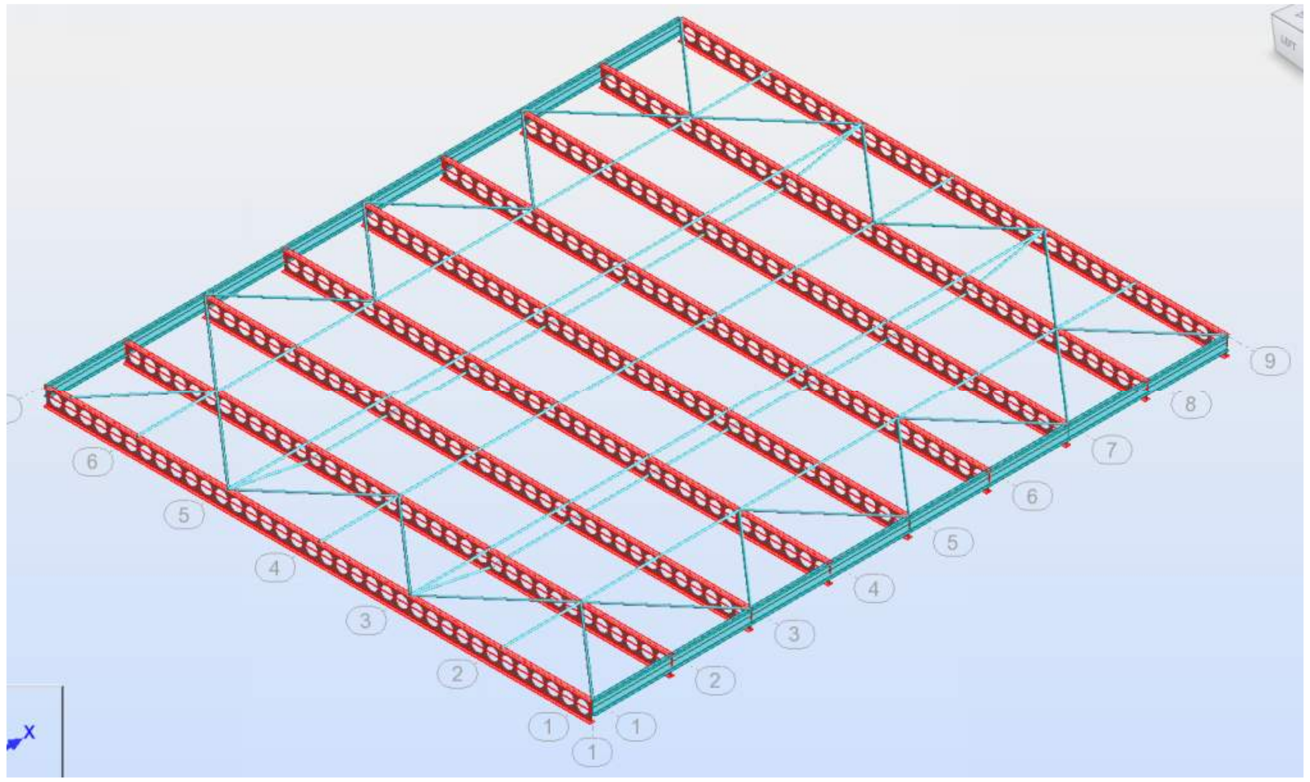
Steelwork – primary/secondary beams:	71 Tonnes
Steelwork – In plane bracing:	4.5 Tonnes
(Purlins and Roof Deck additional)	
Miscellaneous Steelwork/Connections:	Allow 20% additional tonnage

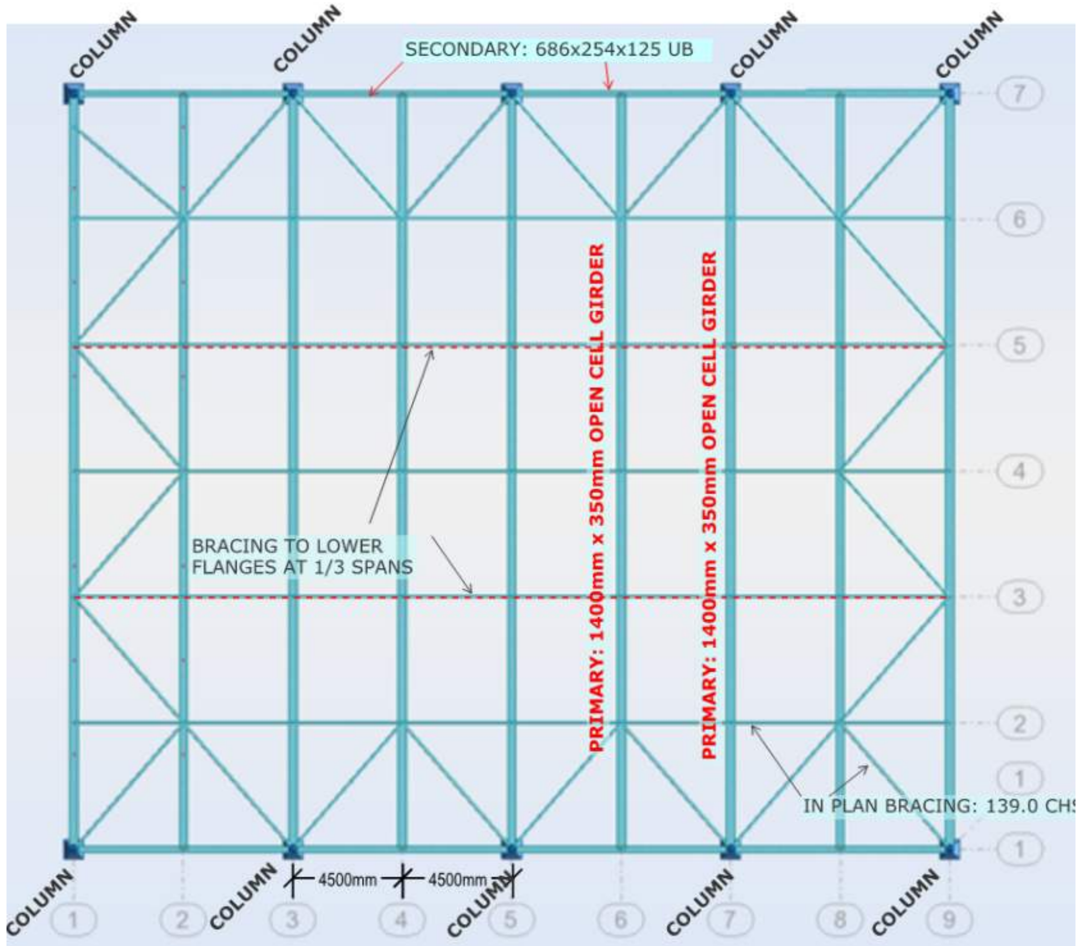
NOTES

- Primary Beams brought to site in three sections (splices at 1/3 points). Assembled on ground and lifted into place
- Diagonal bracing installed as roof erected
- Services zone beneath beams

Long Span Roof Studies

Variant B – Fabricated Steel Beams + Open Cells





BEAM SPAN: 31.0m

COLUMN SPACING: 9.0m

PRIMARY BEAM SPACING: 4.5m

PROPOSED ROOF SLAB: METAL DECK ON PURLINS (ELEMENT LENGTH: 9m – DOUBLE SPAN)

DESIGN CRITERIA

LOADING

SW	AS CALCULATED
Gk (SID)	DECK (0.35), FINISHES (0.25), SERVICES (0.25): 0.85 kN/m^2
Qk (ROOF)	0.60 kN/m^2
Qk (SNOW)	0.60 kN/m^2
Qk (WIND)	+0.20/-0.75 kN/m^2

SERVICABILITY LIMITS

DEFLECTION (TOTAL):	SPAN/150
DEFLECTION (POST CONSTRUCTION):	SPAN/250
VIBRATION (WIND):	2Hz MIN

MATERIAL QUANTITIES

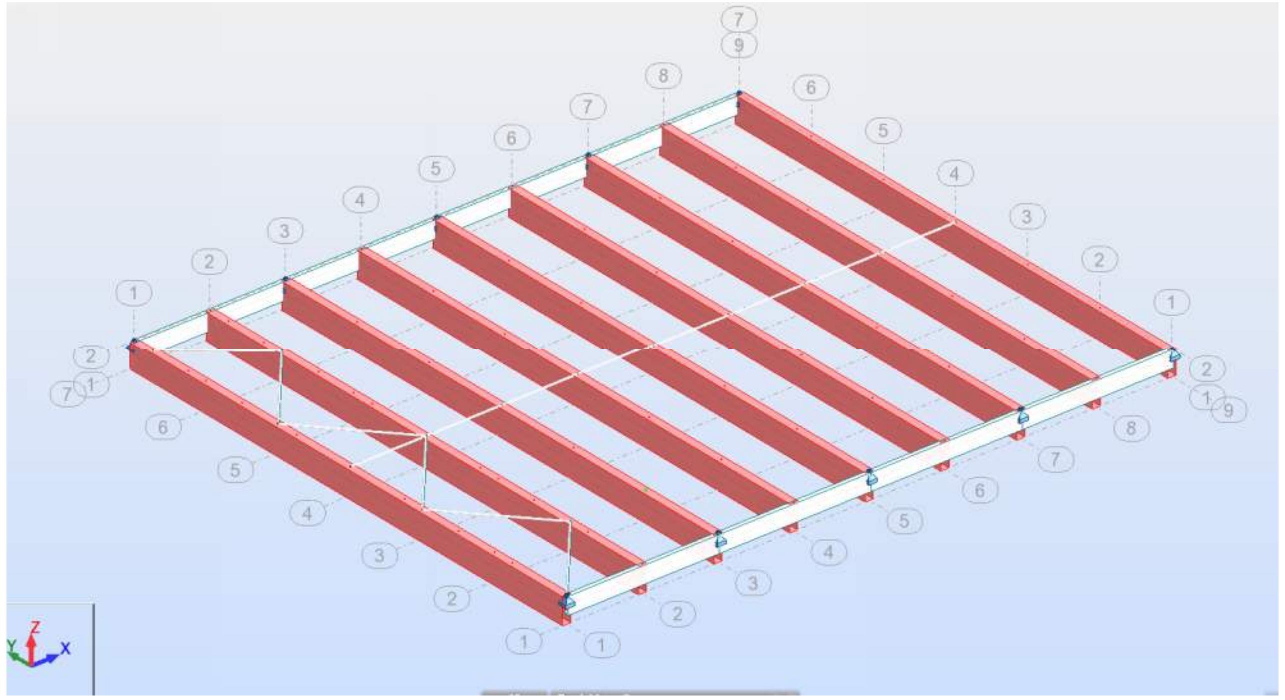
Steelwork – primary/secondary beams:	63 Tonnes
Steelwork – In plane bracing:	4.5 Tonnes
(Purlins and Roof Deck additional)	
Miscellaneous Steelwork/Connections:	Allow 20% additional tonnage

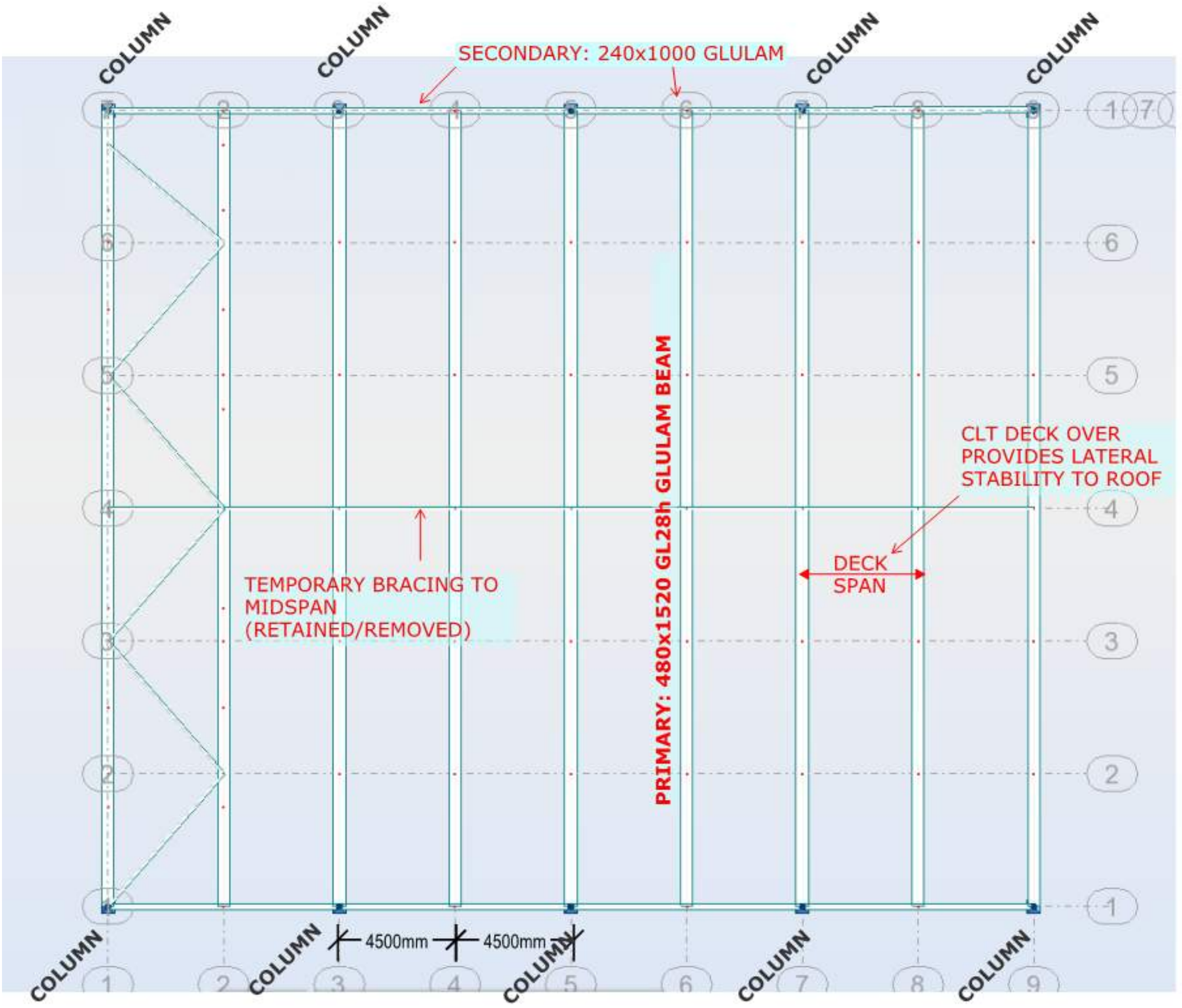
NOTES

- Primary Beams brought to site in three sections (splices at 1/3 points). Assembled on ground and lifted into place
- Diagonal bracing installed as roof erected
- Open cells (750mm) allows services to pass through

Long Span Roof Studies

Variant C – Solid Glulam Beams





BEAM SPAN: 31.0m

COLUMN SPACING: 9.0m

PRIMARY BEAM SPACING: 4.5m

PROPOSED ROOF SLAB: 100mm 3-Layer CLT Deck (ELEMENT LENGTH: 9.0m – DOUBLE SPAN)

DESIGN CRITERIA

LOADING

SW	AS CALCULATED
Gk (SID)	DECK (0.50), FINISHES (0.25), SERVICES (0.25): 1.00 kN/m^2
Qk (ROOF)	0.60 kN/m^2
Qk (SNOW)	0.60 kN/m^2
Qk (WIND)	+0.20/-0.75 kN/m^2

SERVICABILITY LIMITS

DEFLECTION (TOTAL):	SPAN/150
DEFLECTION (POST CONSTRUCTION):	SPAN/250
VIBRATION (WIND):	2Hz MIN

MATERIAL QUANTITIES

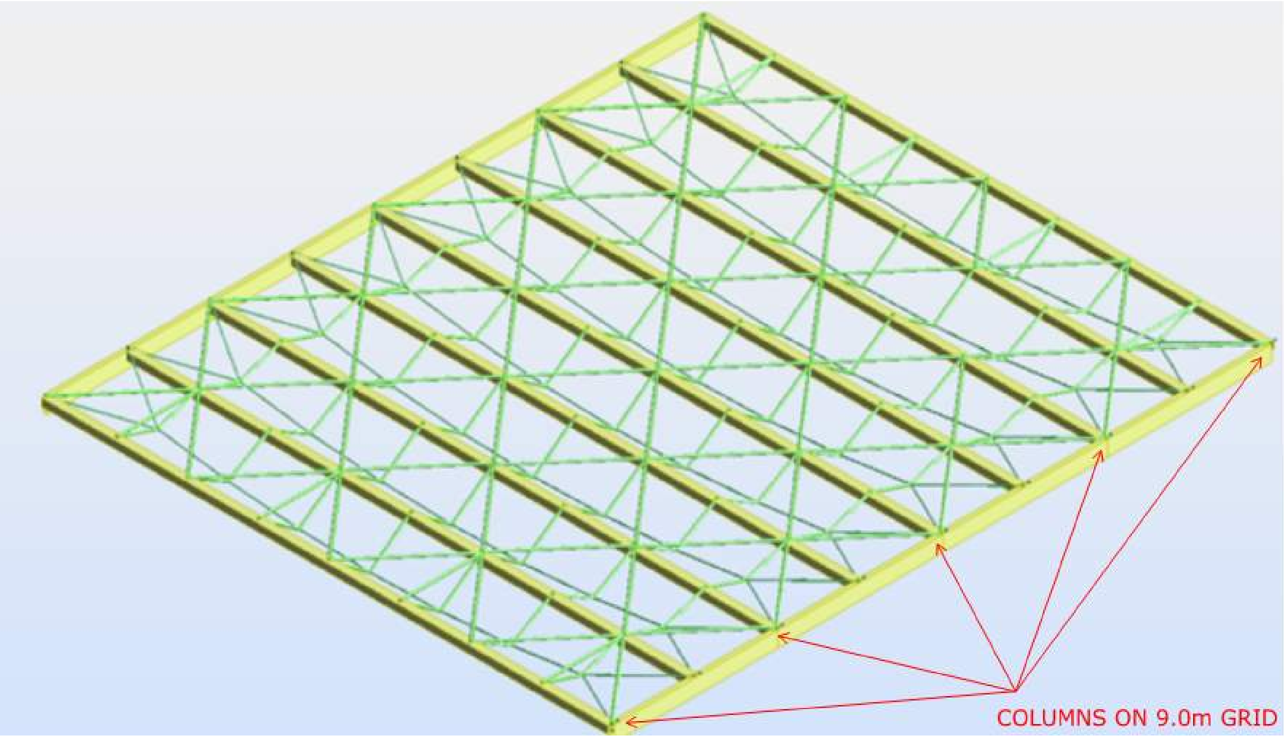
Glulam Primary/Secondary Beams	99 Tonnes
CLT Roof Deck	50 Tonnes
Temporary in-plane bracing	2 Tonnes
Miscellaneous Steelwork/Connections:	Allow 10 Tonnes

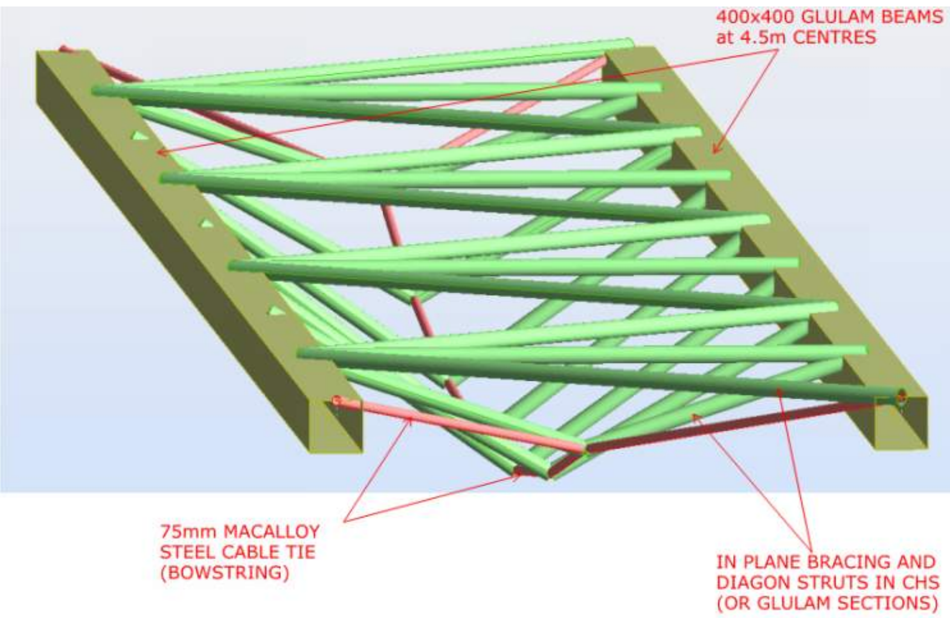
NOTES

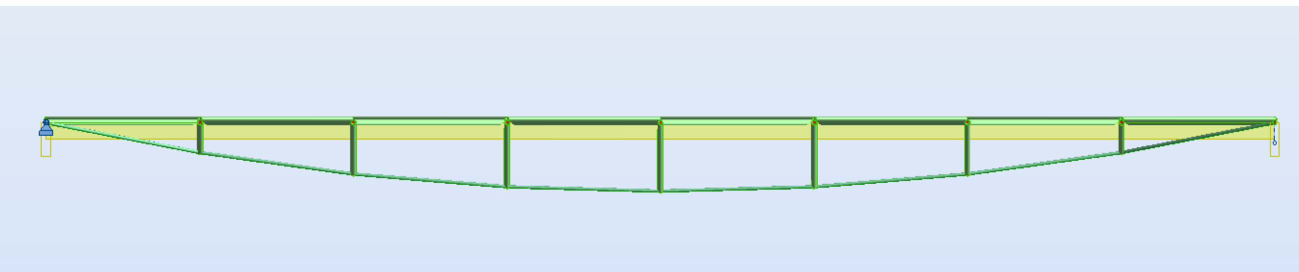
- Primary Beams brought to site in three sections (splices at 1/3 points) with steel plates and bolts. Connection plates/bolts to be high grade stainless steel.
- Diagonal bracing installed as roof erected for temporary lateral restraint – may be removed after installation when CLT deck provides roof diaphragm action
- System could be coupled with Glulam Columns and CLT walls in sports hall as a viable alternative to steel columns and masonry infill

Long Span Roof Studies

Variant D – 3D Hybrid Bowstring Truss







BEAM SPAN: 31.0m

COLUMN SPACING: 9.0m

PRIMARY BEAM SPACING: 4.5m

PROPOSED ROOF SLAB: 140mm 3-Layer CLT Deck
(ELEMENT LENGTH: 9.0m – DOUBLE SPAN)

DESIGN CRITERIA

LOADING

SW	AS CALCULATED
Gk (SID)	DECK (0.75), FINISHES (0.25), SERVICES (0.25): 1.25 kN/m^2
Qk (ROOF)	0.60 kN/m^2
Qk (SNOW)	0.60 kN/m^2
Qk (WIND)	+0.20/-0.75 kN/m^2

SERVICABILITY LIMITS

DEFLECTION (TOTAL):	SPAN/150
DEFLECTION (POST CONSTRUCTION):	SPAN/250
VIBRATION (WIND):	2Hz MIN

MATERIAL QUANTITIES

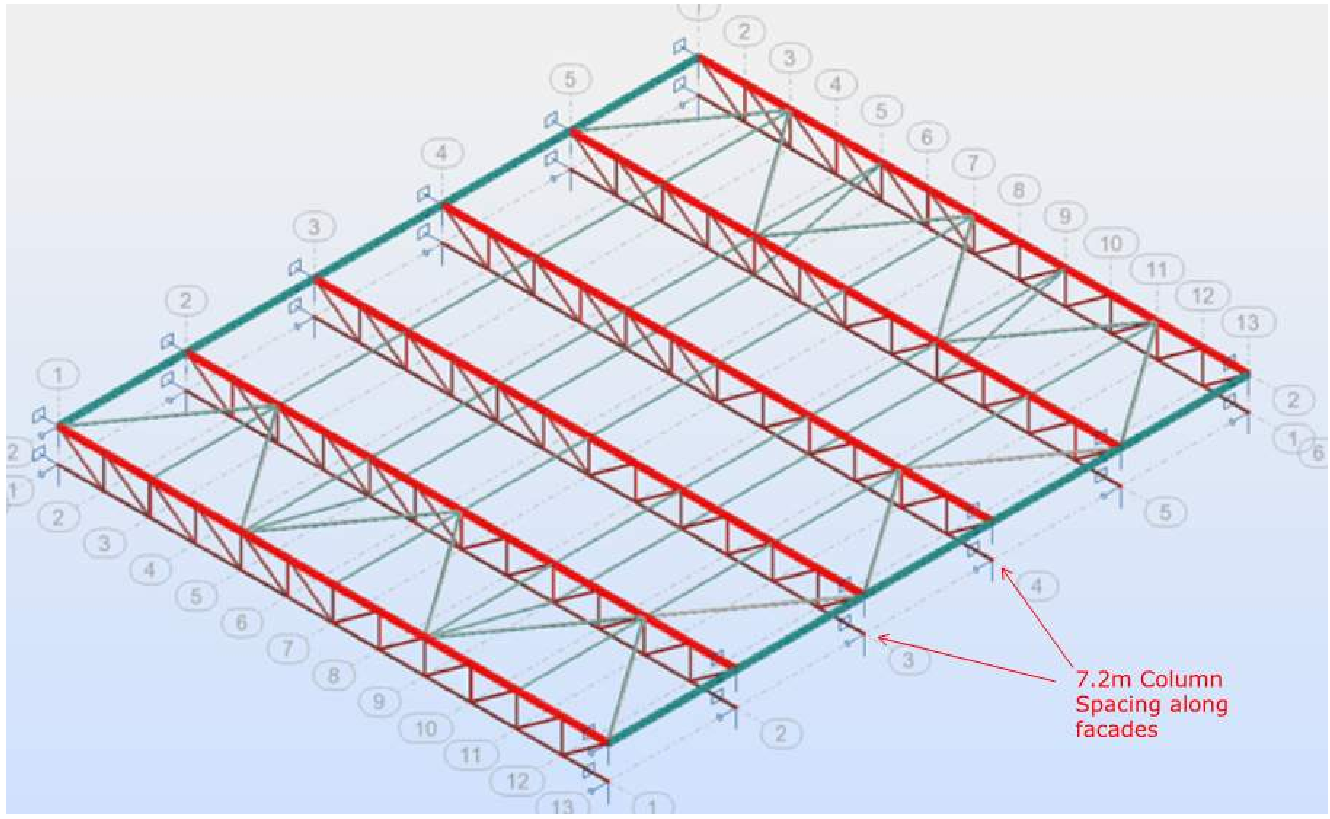
Glulam Primary/Secondary Beams	29 Tonnes
Steel Bowstring/Struts/Bracing	25 Tonnes
CLT Roof Deck	72 Tonnes
Miscellaneous Steelwork/Connections:	Allow 5 Tonnes

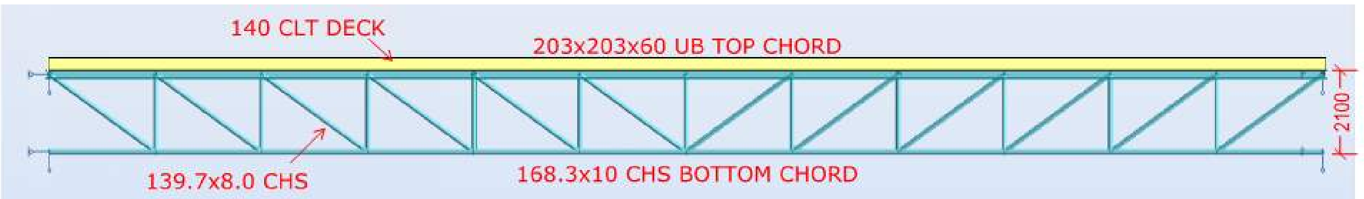
NOTES

- Thick CLT Deck required to restrain lightweight cable truss against load reversal from wind suction
- System could be coupled with Glulam Columns and CLT walls in sports hall as a viable alternative to steel columns and masonry infill

Long Span Roof Studies

Variant E – Steel Truss (Pratt)





BEAM SPAN: 31.0m

COLUMN SPACING: 7.2m

PRIMARY BEAM SPACING: **7.2m**

PROPOSED ROOF SLAB: 140mm 5-Layer CLT Deck
(ELEMENT LENGTH: 14.4m – DOUBLE SPAN)

DESIGN CRITERIA

LOADING

SW	AS CALCULATED
Gk (SID)	CLT DECK (0.75), FINISHES (0.25), SERVICES (0.25): 1.25 kN/m^2
Qk (ROOF)	0.60 kN/m^2
Qk (SNOW)	0.60 kN/m^2
Qk (WIND)	+0.20/-0.75 kN/m^2

SERVICABILITY LIMITS

DEFLECTION (TOTAL):	SPAN/150
DEFLECTION (POST CONSTRUCTION):	SPAN/250
VIBRATION (WIND):	2Hz MIN

MATERIAL QUANTITIES

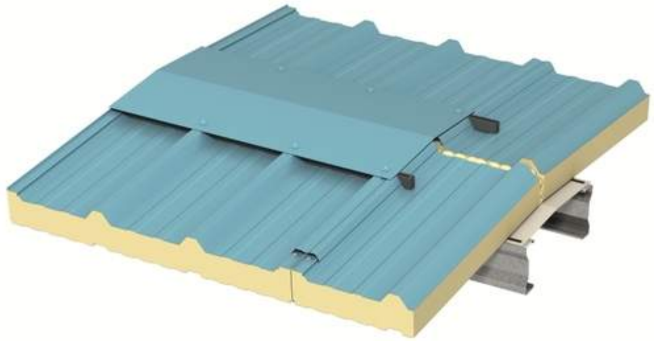
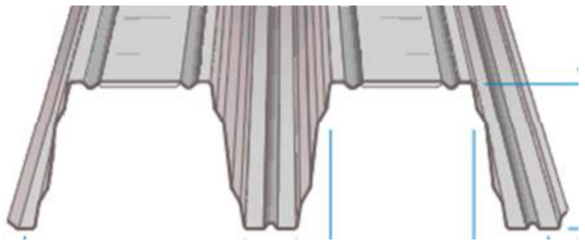
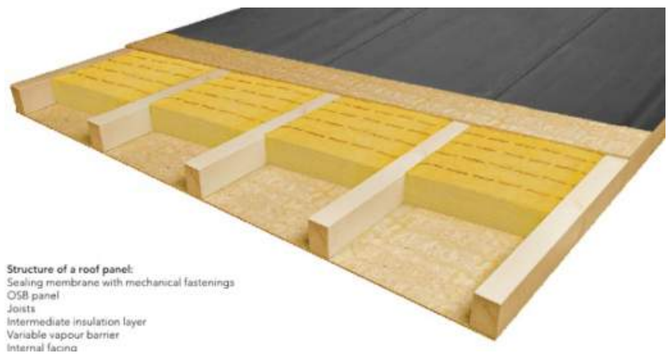
Steelwork – primary/secondary beams:	28 Tonnes
Steelwork – In plane bracing:	5.0 Tonnes
CLT Roof Deck	72 Tonnes
Miscellaneous Steelwork/Connections:	Allow 20% additional tonnage

NOTES

- Overall Depth of Truss: 2100mm
- Trusses brought to site in three sections (splices at 1/3 points). Assembled on ground and lifted into place
- Diagonal bracing installed as roof erected
- Use of CLT roof would allow some in-plane bracing to be removed after installation.
- CLT decks on shorter span areas offer good plant area platforms

Long Span Roof Studies

Roof Deck Options

Roof Deck		Typical Spans Achievable	Weight	Notes
COMPOSITE METAL DECK ON PURLINS		Roof Decks: Upto 3.0m Purlins: Upto 7.5m (400mm purlins)	Deck: 20 kg/m^2 Purlins: 15 kg/m^2	Roof deck thickness dependant on U-Value required. Typical decks are 100-200mm thick. Special versions available to support plant loads
SINGLE PLY LONG-SPAN METAL DECK		8.5m	Deck: 10-20 kg/m^2 Finishes: 20 kg/m^2 allowance	Build-up of finishes over liner typically includes insulation and single ply weatherproof membraine Special versions available to support plant loads
CROSS LAMINATED TIMBER (CLT) PANEL		7.5m	45-72 kg/m^2	Typical deck thicknesses 100-160mm depending on span Typically able to support moderate plant loads without special measures
TIMBER CASSETTE		7.5m	40 – 65 kg/m^2	Typical Deck Thicknesses 200-400mm Not generally suited for supporting plant loads

Appendix 3 – Mechanical and Electrical Engineers Report

sheerwater
consultancy limited

DOVER LEISURE CENTRE

DESIGN & SERVICE REQUIREMENTS
WATER TREATMENT SYSTEMS

Date	7th June 2016
Issue	A
Contract	Dover Leisure Centre
Sheerwater Consultancy Limited	13 Stocks Brow, Tintwistle, Glossop, Derbyshire, SK13 1LG
Landline Mobile	01457 857264 07766 738167
Email	sheerwater123@btinternet.com
Registered in England	No. 4408935

Scope

The leisure centre is to incorporate a 25m. x 8 lane main pool and a 15m. x 8.5m. teaching pool.

1. Filtration & Water Treatment Systems

The filtration and water treatment systems are to incorporate medium pressure sand filtration with PAC (polyaluminium chloride) for coagulation, chlorine disinfection in the form of sodium hypochlorite (complimented by UV treatment) and hydrochloric acid for pH correction.

The systems are to be designed in accordance with the PWTAG Guidelines together with the relevant criteria as follows:-

Main Pool

Volume	$638m^3$
Turnover	3 hours
Hourly Flow	$213m^3$
Filters	2 x 2.4m. diameter vertical
Filter Area Total	$9.04m^2$
Filtration Rate	23.56m./hour
Maximum Instantaneous Bathing Load (based on circulation rate)	125

Teaching Pool

Volume	$120m^3$
Turnover	1 hour
Hourly Flow	$120m^3$
Filters	2 x 1.8m. diameter vertical
Filter Area Total	$5.09m^2$
Filtration Rate	23.6m./hour
Maximum Instantaneous Bathing Load (based on circulation rate)	71

2. Balance Tank

A balance tank is to be incorporated for each of the systems and these are to be located under the pool surround at the side of each respective pool. The positions and physical sizes of the tanks are to be agreed with the Architect and Structural Engineer and tanks are to comply with the requirements in relation to the Regulations on ‘Access to Confined Spaces’ and the Recommendations laid down by PWTAG.

Main pool minimum operating volume	$35m^3$
Teaching pool minimum operating volume	$20m^3$

3. Filter Backwashing

It is proposed that filter backwashing will be carried out at the end of each operating day. Under normal bathing load conditions it will probably be necessary to wash each filter once per week, but this may increase during heavy bathing load periods.

At the current time, on most new swimming pool projects it is usual practice for the local Water Company to limit the flow rate to foul to within approximately 5 litres/second. If this Regulation is applied on this particular contract it will be necessary to include an attenuation/backwash holding tank as part of the drainage systems. The size of the tank is to be based on the following:-

Item	**Each of the Main Pool Filters**	**Each of the Teaching Pool Filters**
Backwash flow rate	38 itres/second	22 litres/second
Length of backwash process	7 minutes	7 minutes
Volume discharged	15.96m^3	9.42m^3

Assuming that the attenuation tank is allowed to drain after backwashing each filter, the tank would have to have a minimum operating volume capacity of 16m^3. If it is necessary to design the system to enable two filters to be washed consecutively, then the volume of the tank would have to be increased to 32m^3.

The engineer responsible for drainage is to determine how the tank is to be drained to foul and vented.

4. Drainage Requirements

4.1 Approximately five drainage gullies will be required in the floor of the filtration plantroom.

4.2 DRENCH SHOWER DRAINAGE STILL TO BE DECIDED.

5. Services

5.1 Electrical

Electrical supplies will be required as follows:-

Main filtration plantroom	50Kw.

All the above supplies are to be 415 volt, 3 phase and neutral and the above figures do not take into account power factor correction.

5.2 Water Supply

A makeup water supply will be required, terminating at an agreed point in the filtration plantroom and this should be based on a flow rate of 2 litres/second. The maximum flow rate will be required after filter backwashing for pool water makeup. Filter backwashing is usually carried out at the end of the operating day, which allows the pool water makeup to operate overnight when the demand for water in the remainder of the building is low.

Additional water supplies will be required for the following:-

- The sink in the main plantroom.
- Hose down point in the main plantroom.
- Hose down point in each of the chemical rooms.
- Drench shower in each of the chemical rooms.

5.3 Heat Requirements

We assume that low pressure hot water will be provided to initially heat the pool water, raising the volume of the water temperature by 0.5^0C per hour. Plate heat exchangers should be provided as part of the filtration contract and it is usual practice, for the controls on the low pressure hot water side, to be provided by the mechanical contractor. LPHW – 70^0C supply and 50^0C return.

Pool	**Anticipated Pool Water Temperature**	**Anticipated Heat Load**
Main	28 - 29^0C	371Kw.
Teaching	29 - 30^0C	70Kw.

6. Ventilation

6.1 Chemical Rooms

Whilst the PWTAG Guidelines indicate that natural ventilation is acceptable it would be preferable to incorporate forced ventilation, the recommended rate being four air changes per hour.

6.2 Filtration Plantroom

The mechanical and electrical consultant should assess whether or not forced ventilation is required in the main plantroom, giving consideration to the fact that this room also accommodates the boilers, electrical equipment etc.

Dover Leisure Centre

MEP Basis of design stage 2 report

Doc No:	P2007256 – WLC_BDP_ZZ_ZZ_RP_MEP_ZZ_0002
Issue:	Stage 2
Rev:	P01
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Author	SS/AM
Checked	SM

Contents

Revision History:

Revision	Description	Issued by	Date	Checked
P01	Stage 2 Issue	AM	16.06.2016	SM

1.0 Executive Summary

This document has been produced to record the current interim stage 2 basis of design, and the MEP process through to issue of planning information.

The general approach to the MEP servicing strategy is as follows;

- BDP programme and deliverables provided in the appendices.

- Adoption of mechanical ventilation strategy in line with requirements of the building function.

- Design of the MEP systems to be primarily as below with early supply chain engagement to drive efficiencies: -

  - Standard above ground drainage by services,
  - Rainwater harvesting required.
  - Rainwater design by GT Architect
  - Domestic water services to break tank and booster set with hot water generation
  - Heating options under consideration
    - Gas fired boilers with lead CHP plant complete with thermal buffer
  - Air source heat pumps and heat recovery for cooling in Gym, etc.
  - Variable speed air handling plant for pool, gym, studios, spinning, wet and dry changing areas
  - Consideration for natural ventilation to general circulation and hall – subject to suitable flow rates

- Pool Process plant sketch information has been provided by Sheerwater and interpreted onto layout drawings BDP MEP sketch Drawings included as Appendix.

- Requirements to meet general development guidance and the intention is to improve upon the carbon requirements of Part L 2013 by up to 10% by being LEAN and MEAN any further enhancement to this would be proposed by renewables following a suitable feasibility study (likely options are micro CHP, solar thermal, solar photovoltaics and air source heat pumps) i.e. BE GREEN.

- Requirement to meet the brief requirements of BREEAM VERY GOOD

- No spare capacity to be allowed within the mechanical systems design beyond standard engineering margins.

- 25% spare capacity to be allowed for within electrical distribution systems for future load increases.

- 20% spare capacity to be allowed for data cabling future requirements.

- There is currently no requirement for Sprinklers system and/or gas suppression within ICT server room

- GT Architects to incorporate full plant, risers and horizontal distribution requirements as indicated upon the MEP spatial requirement sketches.

- Room data sheets will be developed during the stage 3 process.

- Public Address system will be provided.

- Assumption of limited use of access control and CCTV provisions will be included.

- Fire alarm system design category to be advised by the Fire Consultant

2.0 Qualitative Requirements

The following standards and guidance will be followed in the design of the MEP design of the leisure centre;

- 10% Improvement on the requirements of part L.

- BREEAM Very Good.

- Generally the mechanical & electrical services shall be designed in compliance with current editions of:

  - The Gas Safety Regulations
  - BS EN 12056 – Above ground drainage
  - BS EN 806 – Specifications for installations inside buildings conveying water for human consumption
  - BS 6173 Installations of gas-fired catering appliances for use in all types of catering establishments (2nd and 3rd family gases)
  - CIBSE Design Guides Building Services Industry Standards
  - CIBSE Guide A: Environmental Design
  - CIBSE Guide B: Heating, Ventilation, Air-Conditioning and Refrigeration.
  - CIBSE Guide F: Energy Efficiency in Buildings
  - CIBSE Guide G: Public Health Engineering.
  - CIBSE Guide H: Building Control Systems.
  - CIBSE Guide L: Sustainability
  - CIBSE Applications Manual 10: Natural Ventilation in Non-Domestic Buildings:
  - CIBSE TM13 – Minimising the Risk of Legionnaires Disease.
  - Sport England – Swimming Pool Design Guidance Note
  - Sport England – Badminton Design Guidance Note
  - Sport England – Artificial sports lighting design guide 2012
  - Sport England - Sports halls: Design and Layouts design guide
  - Sport council - Swimming Pools Guidance Notes - Building Services
  - Standards for Swimming pool - SPATA - Volume 02
  - Institute of Gas Engineering Publication IGE/UP/1&2
  - IM25 – Gas safety in educational premises
  - BREEAM
  - BS 8300, Design of buildings and their approaches to meet the needs of disabled people
  - ISO 11801 - 2nd Edition International Standards
  - BS7671 - Requirements for Electrical Installations / IET Wiring Regulations
  - BS 8206-2 Lighting for Buildings: Code of Practice for Daylighting
  - BS EN 12464-1 Light and lighting - Lighting of work places. Indoor work places
  - BS EN 12464-2, Light and lighting - Lighting of work places. Outdoor work places

- SLL Code for Lighting:
- BS EN 5266-1 – Code of practice for the emergency escape lighting of premises
- BS EN 1838 – Lighting applications - emergency lighting
- Industry Standard 1006:2012 – Emergency lighting design guide
- BS EN 5489-1 – Code of Practice for the Design of Road Lighting, Lighting of roads and public amenity areas
- BS EN 13201-2 – Code of Practice for the Design of Road Lighting
- BS EN 50173-1, 2, 3 – Information technology - Generic cabling systems
- BS 6701 – Telecommunications equipment and telecommunications cabling - Specification for installation, operation and maintenance
- BS EN 50346 – Information technology. Cabling installation. Testing of installed cabling
- ANSI TIA EIA 568-B – Commercial Building Telecommunications Cabling Standard
- BS EN 50174-1, 2 and 3 – Information Technology Cabling Installations.
- BS EN 50131 – Alarm systems - Intrusion and hold-up systems. System
- BS 50133 – Alarm systems. Access control systems for use in security applications.
- BS EN 60839-11-2 – Alarm and electronic security systems. Electronic access control systems - application guidelines
- National Code of Practice 104
- EN 62676-4 – Video surveillance systems for use in security applications.
- BS6259 Public Address
- BS 5839-1 – Fire detection and fire alarm systems for buildings. Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises
- BS 5839-9 – Fire detection and fire alarm systems for buildings. Code of practice for the design, installation, commissioning and maintenance of emergency voice communication systems
- BS 8519 – Code of Practice for Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting applications
- BS EN 50310 – Code of Practice for Application of equipotential bonding and earthing in buildings with information technology equipment
- BS7430 - Code of Practice for protective earthing of electrical installations
- BSEN 62305 – Code of Practice for protection of structures against lightning
- NJUG Volume 1 Guidelines On The Positioning and Colour Coding of Underground Utilities' Apparatus
- BS EN 81 – Lifts and service lifts. Safety rules for the construction and installation of electric lifts.

3.0 Quantitative Requirements

The following describes the approach to servicing being adopted for the stage 2 design.

Service	Solution	Reasoning
Below Ground pipework	By others	By others
Above Ground Drainage	PVC pipework to be utilised for soil and waste above ground drainage.	Utilising plastic pipework will provide cost saving.
Rainwater Harvesting	Capture into tank within the building basement level	
Mains cold water	New incoming main to feed potable water and potential fire hydrant	A new application for a water connection will need to be made approximately 3.5l/s for the potable and circa 1500l/min for the hydrant.
Domestic cold water	Storage tank and booster set for potable water	To maintain suitable system pressure and to hold a capacity in the building should the external mains fail.
	Storage tank and cat 5 for washdown and similar supplies	To comply with water regulations
Domestic hot water	Heat interface units connected to LTHW distribution.	Towards part L 2010
Natural Gas	Low pressure natural gas will be provided to plantroom equipment	A new supply for approximately 1300kW will be required. Engage with the gas shipper for availability.
Heating	Generation : CHP, boilers and VRF systems Distribution : LTHW to AHU's, radiators and under floor heating	Towards part L 2013 + 10% CHP works well with constant heating load of the two swimming pools

	Electric Door curtains	
Cooling	VRF– to FCU's in server room / comms room + fitness suite and activity studio. Eco-cooler type DX AHU for activity + fitness.	Utilise VRF & DX units to provide electrical demand for CHP.
Ventilation	Centralised air handling units, zoned to suit areas being served. In changing rooms provide egg crate grills. Variable Flow AHU to Pool Hall.	Centralised air handling units meet design requirements.
Energy Metering	Extensive energy metering to be provided along with an energy management system on the BMS	Good practice to allow MC to control energy costs.
'Renewables'	CHP, Solar thermal and Solar PV potential to be investigated further	To meet planning requirements and generate savings. Further renewable requirements to be on risk register until part L model produced.
Incoming electrical Supply	A new LV supply will be derived from a new 500kVA sub-station located internally to the building. Site investigation required.	To accommodate the current anticipated maximum demand and any future expansion if required Spare capacity available at local sub-stations. Site investigation required.
Incoming Telecoms	To be provided by ISP and Network specialist via diverse routes.	Provides for resilient, secure configuration of incoming network services.
Mains Distribution	The main LV switchboard to comprise of an 800A switchboard. The switchboard to comprise ACB / MCCB incomer with MCCBs for outgoing services. Automatic power factor correction to be provided to the main switchboard.	To accommodate the current anticipated maximum demand and any future expansion if required
Submains Distribution	Sub-main cablings from main distribution panel (via sub distribution	Cost effective solution for low rise buildings with low number of sub-mains

	panels if required) on containment in voids where possible. The sub-main distribution to take the form of XLPE/SWA/LSF multi core cables run from the main switchboard, to local distribution boards positioned in the plantrooms and electrical cupboards and stores. Where an area and facility requires supplies of differing levels of integrity separate distribution boards to be provided for each level of supply. The distribution boards are to be of the wall mounted type with MCCBs or MCB's providing protection to the outgoing circuits. The local distribution boards to be either type "A" or "B" single or three phase as required, generally having type 'B' and 'C' MCB's providing protection to the outgoing circuits.	
UPS / Essential supplies	UPS space provision only in hub/comms rooms. Essential supplies to life safety systems to be included with relevant system where needed. Swimming pool to be provided with central battery system for safe lighting.	Decentralised approach to UPS meaning no single point of failure for all systems
Containment systems	Primary containment is to be provided within ceiling voids where possible, via combination of cable ladders and medium/heavy duty cable trays for submain cables, cable baskets for Data, fire alarm, security and other ELV items, trunkings for lighting and power	Robust re-wireable installation for power and cost effective easily maintainable for data/ELV cabling

	Secondary containment is to be provided via conduits & dado trunkings for various electrical installation.	
Small Power	To suit ICT & FF&E Requirements. Cleaners sockets throughout	To meet operational requirements of the building
Lighting	Lighting is to be provided throughout all areas of the building to achieve the required lighting levels and uniformity ratios. The light levels are the average maintained illumination levels, taking into account maintenance factors, lamp lumen depreciation, colour and texture of finishes, furniture and equipment (including nets, curtains etc.) and glare control. The lighting design in a badminton hall must take into consideration the requirements for provision of: • A safe environment for players • Effective illumination of the shuttlecock and court markings to aid players and to assist match officials in the execution of their duties • Suitable and sufficient lighting for spectators. Light fittings not to be mounted above the pool to facilitate maintenance. Light fittings to be directed so as to avoid glare or reflection to bathers and staff. The use of uplighters is preferred as opposed to using direct lighting. Providing reliable and evenly spread artificial underwater lighting can be difficult to achieve. Underwater areas	To provide general lighting to the general environment and working plane considering energy efficiency, maintenance, colour, appearance, rendition, and glare control.

	left in shadow can be detrimental to the ability to see objects clearly in the pool. Underwater lighting therefore requires careful specialist design and would form part of the swimming pool specialist package.	
Emergency Lighting	Luminaires that are normally operational are utilised to provide the emergency lighting. Generally emergency lighting to be provided by integral self-contained emergency packs within normal luminaires. This system to provide 3-hour backup for all the emergency luminaires. Pool hall lighting to consist of self-contained / central battery system flood packs to IP65, positioned around the perimeter of the pool to provide 5lux minimum for 3hrs (general emergency lighting) and 5% of the maintained illuminance for 30s (for safe stopping of an event)	To provide emergency lighting to escape routes and open areas. Locate emergency exit signs to define clear and unambiguous escape routes.
External Lighting	Lighting to any external walkways to be provided to allow egress and access to the space with emergency fittings installed as required by Building Control and Approved Inspector Services to the requirements of BSEN 5266-1 and BS EN 1838	To provide safe movement into and around the building during hours of darkness
Clocks	Auto updating battery clocks throughout	To be provided as part of FF&E package (not included in MEP package)
Induction Loops	Provided at main reception desk, swimming pools, studio and fitness suite Portable unit also to be provided	Areas where 1 to 1 interaction is commonplace and key locations for announcements and media requirement.

		Portable loop to allow flexibility in use.
Disabled Refuge Alarms	At each disabled refuge point	TO BS5839 and BS8300
Fire Alarms	An addressable analogue AFD system to be provided in the building in conformity with BS 5839 Part 1. This to cover horizontal and vertical escape routes and any identified areas of enhanced fire risk. The system to include detector devices, break glass call points, and sounders, on all escape route and vulnerable spaces, smoke detection to be included within all voids/ ceiling voids with a greater height than 0.8 m. Call points to be sited at final exits and other locations such that no one has to travel more than 30m to a call point.	As per Fire Consultant's advice.
Security Systems	Motion detection and door contacts to protect all entry points and accessible ground floor areas and circulation spaces	To ACPO, NACOSS and Sports England requirements
Accessible alarms	Each designated accessible toilet to be provided with an independent alarm system. All accessible alarms to be remotely monitored at the reception area. Poolside alarms Each lifeguard position to be provided with an independent alarm system. All alarms to be remotely monitored at the reception area Drowning alarms for swimming pool with repeaters at Reception and Plantroom	To provide alerting alarm for people with disability or when anybody is in need in the swimming pool

Access control	Electronic access control limited to secured areas requiring frequent usage and main entrances, IT hub/server rooms	Based on previous similar leisure projects
Intercom	Audio 2 way system only at Vehicle entrances to site, main entrance and plant room external access	Based on previous similar leisure projects
Public Address / Audio Equipment	A separate non-emergency public address system shall be provided to building. This shall have its own dedicated announcement and control system. The system shall be capable of being zoned off so that different areas can be either isolated or the volume controlled locally. The system shall be linked into the fire alarm system so that the system does not operate during a fire alarm condition.	To broadcast various announcements and TV/Radio/Audio signals throughout the building from a central source
CCTV	Coverage to building perimeter, main entrances, reception, changing room exit to lobby and circulation spaces only. CCTV may also be used for the purpose of the drowning alarm in the swimming pool depending on the final solution	To monitor entrance and exits building and common circulation to help deter intruders & criminal behaviour
TV Aerial	Multi receiver points on roof and utilise IPTV via ICT network. Leisure to provide Distribution active equipment	Flexibility in TV locations and removing need for independent distribution system
Vertical Transport	2 No. in total Requirement of Evacuation lift to be confirmed	In line with design for access document In line with Fire strategy report

Lightning Protection System	A fully enclosing lightning protection system to be provided to protect the new development utilising the building structure where possible e.g. Copper lightning tape fixed to steelwork. The complete installation to include bonding of all new roof projections as required to meet the requirements of BS EN 62305-1.	

Work in progress issued to the team for coordination and information are;

MEP	P2007256 Deliverables					
Drawing Ref	Drawing Description	Type	Size	Scale	08/06/2016	16/06/2016
DLC-BDP-ZZ-00-DR-MEP-ZZ-0001	LEVEL 00 - COMBINED SERVICES PLANTROOM	PDF	A0	1:50	✓	
DLC-BDP-ZZ-00-DR-MEP-ZZ-0002	COMBINED SERVICES ROUTE - LEVEL 00	PDF	A1	1:50	✓	
DLC-BDP-ZZ-01-DR-MEP-ZZ-0001	LEVEL 01 - COMBINED SERVICES PLANTROOM	PDF	A0	1:50	✓	
DLC-BDP-ZZ-01-DR-MEP-ZZ-0002	COMBINED SERVICES ROUTE – LEVEL 01	PDF	A1	1:50	✓	
DLC-BDP-ZZ-02-DR-MEP-ZZ-0001	ROOFTOP AHU/COMPOUND – LEVEL ROOF	PDF	A0	1:50	✓	
DLC-BDP-ZZ-ZZ-DR-E-70_30-0001	ELECTRICAL DISTRIBUTION AND TRANSMISSION SYSTEMS	PDF	A0	NTS	✓	
WLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0001	SCHEDULE OF MAJOR PLANT	PDF	A3	NA	✓	
SK. SLOU-01	FILTRATION PLANTROOM	PDF	A3	NTS	✓	
	Design & Services Requirements Issue A doc	WORD	A4	NA	✓	
DLC-BDP-ZZ-ZZ-DR-M-60-0001	SCHEMATIC - HEATING, COOLING AND REFRIGERATION SYSTEMS	PDF	A0	NTS		✓
DLC-BDP-ZZ-ZZ-DR-M-65-0001	SCHEMATIC - VENTILATION AND AIR CONDITIONING SYSTEMS	PDF	A0	NTS		✓

4.0 Part L

The part L assessment thus far has been to compare this centre with other centres and the measures necessary to achieve Part L compliance. The approach on all other centre has been consistently

BE LEAN measures to reduce the dependence on energy by optimising the orientation, shading and fabric performance of the building.

BE MEAN utilise high efficiency plant and fittings to minimise energy consumption

BE GREEN when all the above measures are taken then the amount of green energy from photovoltaics or similar can be optimised to achieve the required carbon reductions at minimum expenditure

The calculations assume the following none MEP parameters are within the cost plan;

- Generally U-values are 20% lower than Part L 2013 allowances.
- Window U-values are 1.1 Centre panes, 1.5 overall.
- East, West, South facing glazing has either G Value of 0.4 or achieves the same via external solar shading.
- Input required regarding curtain wall system.
- Air permeability is 3 $m^3/m^2/hr@50Pa$
- Full metering and sub-metering throughout with separate metering for lighting and power

5.0 Information Required

Stage 2 Information required schedules

Information required		From Who

Appendix A – BDP MEP Planning Deliverables

DOCUMENT REFERENCE									MEP DELIVERABLES	SCALE	PAPER SIZE	RIBA STAGE 2 Lite	RIBA STAGE 3 (TBC)	RIBA STAGE 4 (TBC)	COMMENTS
Project	Originator	Zone	Level	Container	Role	Uniclass	Ref.	Document Number (Combined)							
Externals															
DLC	BDP	ZZ	ZZ	DR	MEP	ZZ	0001	DLC-BDP-ZZ-ZZ-DR-MEP-ZZ-0001	EXTERNAL SITE SERVICES - UTILITIES	1:500	A0	●	●	●	NARRATIVE ONLY STAGE 2
DLC	BDP	ZZ	ZZ	DR	E	70_80	0001	DLC-BDP-ZZ-ZZ-DR-E-70_80-0001	EXTERNAL SITE SERVICES - LIGHTING	1:500	A0		●	●	
DLC	BDP	ZZ	ZZ	DR	E	75_40	0001	DLC-BDP-ZZ-ZZ-DR-E-75_40-0001	EXTERNAL SITE SERVICES - SECURITY	1:500	A0		●	●	
Combined Services Layouts															
DLC	BDP	ZZ	-01	DR	MEP	ZZ	0001	DLC-BDP-ZZ--01-DR-MEP-ZZ-0001	LEVEL -01 - COMBINED SERVICES PLANTROOM LAYOUT	1:50	A1	●	●	●	SPATIAL ARRANGEMENT STAGE2
DLC	BDP	ZZ	00	DR	MEP	ZZ	0001	DLC-BDP-ZZ-00-DR-MEP-ZZ-0001	LEVEL 00 - COMBINED SERVICES PLANTROOM LAYOUT	1:50	A1	●	●	●	SPATIAL ARRANGEMENT STAGE2
DLC	BDP	ZZ	01	DR	MEP	ZZ	0001	DLC-BDP-ZZ-01-DR-MEP-ZZ-0001	LEVEL 01 - COMBINED SERVICES PLANTROOM LAYOUT	1:50	A1	●	●	●	SPATIAL ARRANGEMENT STAGE2
DLC	BDP	ZZ	02	DR	MEP	ZZ	0001	DLC-BDP-ZZ-02-DR-MEP-ZZ-0001	LEVEL 02 ROOF - COMBINED SERVICES PLANTROOM LAYOUT	1:50	A1	●	●	●	SPATIAL ARRANGEMENT STAGE2
DLC	BDP	ZZ	00	DR	MEP	ZZ	0002	DLC-BDP-ZZ-00-DR-MEP-ZZ-0002	LEVEL 00 - COMBINED SERVICES ROUTE	1:100	A1	●	●	●	
DLC	BDP	ZZ	01	DR	MEP	ZZ	0002	DLC-BDP-ZZ-01-DR-MEP-ZZ-0002	LEVEL 01 - COMBINED SERVICES ROUTE	1:100	A1	●	●	●	
BWIC															
DLC	BDP	ZZ	00	DR	MEP	ZZ	0001	DLC-BDP-ZZ-00-DR-MEP-ZZ-0001	LEVEL 00 - BUILDERS WORK IN CONNECTION	1:100	A0			●	
DLC	BDP	ZZ	01	DR	MEP	ZZ	0002	DLC-BDP-ZZ-01-DR-MEP-ZZ-0002	LEVEL 01 - BUILDERS WORK IN CONNECTION	1:100	A0			●	
DLC	BDP	ZZ	02	DR	MEP	ZZ	0003	DLC-BDP-ZZ-02-DR-MEP-ZZ-0003	LEVEL 02 - BUILDERS WORK IN CONNECTION	1:100	A0			●	
50_30 - Drainage collection and distribution systems															
DLC	BDP	ZZ	00	DR	P	50_30	0001	DLC-BDP-ZZ-00-DR-P-50_30-0001	LEVEL 00 - DRAINAGE COLLECTION AND DISTRIBUTION SYSTEMS	1:100	A0		●	●	ABOVE GROUND DRAINAGE (FOUL ONLY)
DLC	BDP	ZZ	01	DR	P	50_30	0001	DLC-BDP-ZZ-01-DR-P-50_30-0001	LEVEL 01 - DRAINAGE COLLECTION AND DISTRIBUTION SYSTEMS	1:100	A0		●	●	ABOVE GROUND DRAINAGE (FOUL ONLY)
DLC	BDP	ZZ	ZZ	DR	P	50_30	0001	DLC-BDP-ZZ-ZZ-DR-P-50_30-0001	SCHEMATIC - DRAINAGE COLLECTION AND DISTRIBUTION SYSTEMS	NTS	A0			●	ABOVE GROUND DRAINAGE (FOUL ONLY)
55_20 - Gas distribution and supply systems															
~~DLC~~	~~BDP~~	~~ZZ~~	~~ZZ~~	~~DR~~	~~P~~	~~55_20~~	~~0001~~	~~DLC-BDP-ZZ-ZZ-DR-P-55_20-0001~~	~~SCHEMATIC - GAS DISTRIBUTION AND SUPPLY SYSTEMS~~	~~NTS~~	~~A0~~	↓	↓	↓	
55_70 - Water distribution and supply systems															
DLC	BDP	ZZ	00	DR	P	55_70	0001	DLC-BDP-ZZ-00-DR-P-55_70-0001	LEVEL 00 - WATER DISTRIBUTION AND SUPPLY SYSTEMS	1:100	A0		●	●	
DLC	BDP	ZZ	01	DR	P	55_70	0001	DLC-BDP-ZZ-01-DR-P-55_70-0001	LEVEL 01 - WATER DISTRIBUTION AND SUPPLY SYSTEMS	1:100	A0		●	●	
DLC	BDP	ZZ	ZZ	DR	P	55_70	0001	DLC-BDP-ZZ-ZZ-DR-P-55_70-0001	SCHEMATIC - WATER DISTRIBUTION AND SUPPLY SYSTEMS	NTS	A0		●	●	
60 - Heating, cooling and refrigeration systems															
DLC	BDP	ZZ	00	DR	M	60	0001	DLC-BDP-ZZ-00-DR-M-60-0001	LEVEL 00 - HEATING, COOLING AND REFRIGERATION SYSTEMS	1:100	A0		●	●	ZONAL LAYOUTS STAGE 2
DLC	BDP	ZZ	01	DR	M	60	0001	DLC-BDP-ZZ-01-DR-M-60-0001	LEVEL 01 - HEATING, COOLING AND REFRIGERATION SYSTEMS	1:100	A0		●	●	ZONAL LAYOUTS STAGE 2
DLC	BDP	ZZ	ZZ	DR	M	60	0001	DLC-BDP-ZZ-ZZ-DR-M-60-0001	SCHEMATIC - HEATING, COOLING AND REFRIGERATION SYSTEMS	NTS	A0	●	●	●	
65 - Ventilation and air conditioning systems															
DLC	BDP	ZZ	00	DR	M	65	0001	DLC-BDP-ZZ-00-DR-M-65-0001	LEVEL 00 - VENTILATION AND AIR CONDITIONING SYSTEMS	1:100	A0		●	●	ZONAL LAYOUTS STAGE 2
DLC	BDP	ZZ	01	DR	M	65	0001	DLC-BDP-ZZ-01-DR-M-65-0001	LEVEL 01 - VENTILATION AND AIR CONDITIONING SYSTEMS	1:100	A0		●	●	ZONAL LAYOUTS STAGE 2
DLC	BDP	ZZ	ZZ	DR	M	65	0001	DLC-BDP-ZZ-ZZ-DR-M-65-0001	SCHEMATIC - VENTILATION AND AIR CONDITIONING SYSTEMS	NTS	A0	●	●	●	
70_30 - Electricity distribution and transmission systems															
DLC	BDP	ZZ	00	DR	E	70_30	0001	DLC-BDP-ZZ-00-DR-E-70_30-0001	LEVEL 00 - ELECTRICITY DISTRIBUTION AND TRANSMISSION SYSTEMS	1:100	A0		●	●	
DLC	BDP	ZZ	01	DR	E	70_30	0001	DLC-BDP-ZZ-01-DR-E-70_30-0001	LEVEL 01 - ELECTRICITY DISTRIBUTION AND TRANSMISSION SYSTEMS	1:100	A0		●	●	
DLC	BDP	ZZ	ZZ	DR	E	70_30	0001	DLC-BDP-ZZ-ZZ-DR-E-70_30-0001	SCHEMATIC - ELECTRICITY DISTRIBUTION AND TRANSMISSION SYSTE	NTS	A0	●	●	●	
70_30_80 - Small power systems															
DLC	BDP	ZZ	00	DR	E	70_30_80	0001	DLC-BDP ZZ-00-DR-E-70_30_80-0001	LEVEL 00 - SMALL POWER SYSTEMS SHEET 1	1:50	A0			●	
DLC	BDP	ZZ	00	DR	E	70_30_80	0002	DLC-BDP ZZ-00-DR-E-70_30_80-0002	LEVEL 00 - SMALL POWER SYSTEMS SHEET 2	1:50	A0			●	
DLC	BDP	ZZ	01	DR	E	70_30_80	0001	DLC-BDP ZZ-01-DR-E-70_30_80-0001	LEVEL 01 - SMALL POWER SYSTEMS SHEET 1	1:50	A0			●	
DLC	BDP	ZZ	01	DR	E	70_30_80	0002	DLC-BDP ZZ-01-DR-E-70_30_80-0002	LEVEL 01 - SMALL POWER SYSTEMS SHEET 2	1:50	A0			●	
70_80 - Lighting systems															
DLC	BDP	ZZ	00	DR	E	70_80	0001	DLC-BDP-ZZ-00-DR-E-70_80-0001	LEVEL 00 - LIGHTING SYSTEMS	1:100	A0		●	●	ZONAL LAYOUTS STAGE 3
DLC	BDP	ZZ	01	DR	E	70_80	0001	DLC-BDP-ZZ-01-DR-E-70_80-0001	LEVEL 01 - LIGHTING SYSTEMS	1:100	A0		●	●	ZONAL LAYOUTS STAGE 3
75_10 - Communications systems															
DLC	BDP	ZZ	ZZ	DR	E	75_10	0001	DLC-BDP-ZZ-ZZ-DR-E-75_10-0001	SCHEMATIC - COMMUNICATION SYSTEMS	NTS	A1		●	●	
DLC	BDP	ZZ	ZZ	DR	E	75_10_68_68	0001	DLC-BDP-ZZ-ZZ-DR-E-75_10_68_68-0001	SCHEMATIC - PUBLIC ADDRESS SYSTEMS	NTS	A1			●	

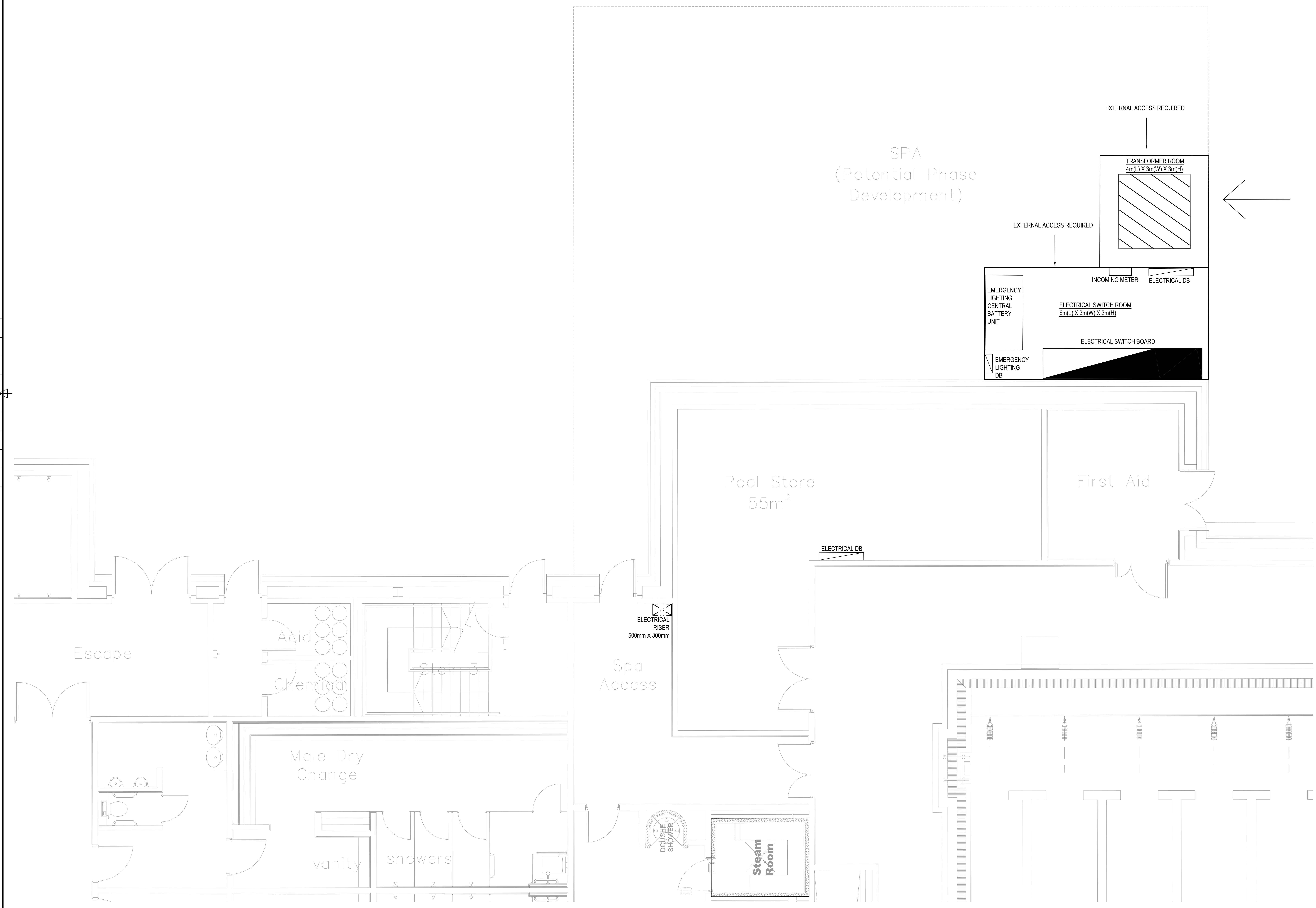
DOCUMENT REFERENCE									MEP DELIVERABLES	SCALE	PAPER SIZE	RIBA STAGE 2 Lite	RIBA STAGE 3 (TBC)	RIBA STAGE 4 (TBC)	COMMENTS
Project	Originator	Zone	Level	Container	Role	Uniclass	Ref.	Document Number (Combined)							
75_40 - Security systems															
DLC	BDP	ZZ	00	DR	E	75_40	0001	DLC-BDP-ZZ-00-DR-E-75_40-0001	LEVEL 00 - SECURITY SYSTEMS	1:100	A0		●	●	ZONAL LAYOUTS STAGE 3
DLC	BDP	ZZ	01	DR	E	75_40	0001	DLC-BDP-ZZ-01-DR-E-75_40-0001	LEVEL 01 - SECURITY SYSTEMS	1:100	A0		●	●	ZONAL LAYOUTS STAGE 3
DLC	BDP	ZZ	ZZ	DR	E	75_40_02	0001	DLC-BDP-ZZ-ZZ-DR-E-75_40_02-0001	SCHEMATIC - ACCESS CONTROL SYSTEMS	NTS	A1		●	●	
DLC	BDP	ZZ	ZZ	DR	E	75_40_53_86	0001	DLC-BDP-ZZ-ZZ-DR-E-75_40_53_86-0001	SCHEMATIC - SURVEILLANCE SYSTEMS (CCTV)	NTS	A1		●	●	
DLC	BDP	ZZ	ZZ	DR	E	75_40_75_40	0001	DLC-BDP-ZZ-ZZ-DR-E-75_40_75_40-0001	SCHEMATIC - INTRUDER DETECTION AND ALARM SYSTEMS	NTS	A1		●	●	
75_50 - Communication, safety and protection systems															
DLC	BDP	ZZ	ZZ	DR	E	75_50_11_05	0001	DLC-BDP-ZZ-ZZ-DR-E-75_50_11_05-0001	SCHEMATIC - ASSISTANCE CALL SYSTEMS (INC. POOL ALARM)	NTS	A1			●	
DLC	BDP	ZZ	ZZ	DR	E	75_50_11_27	0001	DLC-BDP-ZZ-ZZ-DR-E-75_50_11_27-0001	SCHEMATIC - EMERGENCY VOICE COMMUNICATION SYSTEMS	NTS	A1			●	
75_50_28_29 - Fire detection and alarm systems															
DLC	BDP	ZZ	00	DR	E	75_50_28_29	0001	DLC-BDP-ZZ-00-DR-E-75_50_28_29-0001	LEVEL 00 - FIRE DETECTION AND ALARM SYSTEMS	1:100	A0		●	●	ZONAL LAYOUTS STAGE 3
DLC	BDP	ZZ	00	DR	E	75_50_28_29	0002	DLC-BDP-ZZ-00-DR-E-75_50_28_29-0002	LEVEL 00 - FIRE DETECTION AND ALARM SYSTEM ZONES	1:100	A0			●	
DLC	BDP	ZZ	01	DR	E	75_50_28_29	0001	DLC-BDP-ZZ-01-DR-E-75_50_28_29-0001	LEVEL 01 - FIRE DETECTION AND ALARM SYSTEMS	1:100	A0		●	●	ZONAL LAYOUTS STAGE 3
DLC	BDP	ZZ	01	DR	E	75_50_28_29	0002	DLC-BDP-ZZ-01-DR-E-75_50_28_29-0002	LEVEL 01 - FIRE DETECTION AND ALARM SYSTEM ZONES	1:100	A0			●	
DLC	BDP	ZZ	ZZ	DR	E	75_50_28_29	0001	DLC-BDP-ZZ-ZZ-DR-E-75_50_28_29-0001	SCHEMATIC - FIRE DETECTION AND ALARM SYSTEMS	NTS	A1		●	●	
75_80 - Protection systems															
DLC	BDP	ZZ	ZZ	DR	E	75_80_45_25	0001	DLC-BDP-ZZ-ZZ-DR-E-75_80_45_25-0001	SCHEMATIC - EARTHING & BONDING SYSTEMS	NTS	A1			●	
DLC	BDP	ZZ	ZZ	DR	E	75_80_45_45	0001	DLC-BDP-ZZ-ZZ-DR-E-75_80_45_45-0001	LIGHTNING PROTECTION SYSTEMS	1:100	A1			●	
Reports															
DLC	BDP	ZZ	ZZ	RP	MEP	ZZ	0001	DLC-BDP-ZZ-ZZ-RP-MEP-ZZ-0001	MEP DELIVERABLES SCHEDULE	Doc.	A3	●	●	●	
DLC	BDP	ZZ	ZZ	RP	MEP	ZZ	0002	DLC-BDP-ZZ-ZZ-RP-MEP-ZZ-0002	KEY STAGE REPORT	Doc.	A3	●	●	●	
DLC	BDP	ZZ	ZZ	RP	MEP	ZZ	0003	DLC-BDP-ZZ-ZZ-RP-MEP-ZZ-0003	ENERGY STRATEGY REPORT	Doc.	A3		●	●	NOT PART OF STAGE 2 DELIVERABLES
DLC	BDP	ZZ	ZZ	RP	MEP	ZZ	0004	DLC-BDP-ZZ-ZZ-RP-MEP-ZZ-0004	DESIGNERS RISK ASSESSMENT	Doc.	A4		●	●	
DLC	BDP	ZZ	ZZ	RP	MEP	ZZ	0005	DLC-BDP-ZZ-ZZ-RP-MEP-ZZ-0005	ACCESS AND MAINTENANCE REPORT	Doc.	A3		●	●	
~~DLC~~	~~BDP~~	~~ZZ~~	~~ZZ~~	~~RP~~	~~MEP~~	~~ZZ~~	~~0006~~	~~DLC-BDP-ZZ-ZZ-RP-MEP-ZZ-0006~~	~~ACOUSTICS REPORT~~	~~Doc.~~	~~A3~~		↓	↓	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0007	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0007	ROOM DATA SHEETS	Doc.	A4		●	●	
DLC	BDP	ZZ	ZZ	SP	MEP	ZZ	0008	DLC-BDP-ZZ-ZZ-SP-MEP-ZZ-0008	OUTLINE MEP SPECIFICATION	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SP	MEP	ZZ	0009	DLC-BDP-ZZ-ZZ-SP-MEP-ZZ-0009	OUTLINE BMS SPECIFICATION	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SP	MEP	ZZ	0010	DLC-BDP-ZZ-ZZ-SP-MEP-ZZ-0010	ELECTRICAL WORKMANSHIP SPECIFICATION	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SP	MEP	ZZ	0011	DLC-BDP-ZZ-ZZ-SP-MEP-ZZ-0011	MECHANICAL WORKMANSHIP SPECIFICATION	Doc.	A4			●	
Planning reports															
~~DLC~~	~~BDP~~	~~ZZ~~	~~ZZ~~	~~RP~~	~~MEP~~	~~ZZ~~	~~0013~~	~~DLC-BDP-ZZ-ZZ-RP-MEP-ZZ-0013~~	~~FIXED PLANT NOISE ASSESSMENT~~	~~Doc.~~	~~A4~~				
~~DLC~~	~~BDP~~	~~ZZ~~	~~ZZ~~	~~RP~~	~~MEP~~	~~ZZ~~	~~0014~~	~~DLC-BDP-ZZ-ZZ-RP-MEP-ZZ-0014~~	~~UTILITIES ASSESSMENT PLANNING STATEMENT~~	~~Doc.~~	~~A4~~				
~~DLC~~	~~BDP~~	~~ZZ~~	~~ZZ~~	~~RP~~	~~MEP~~	~~ZZ~~	~~0015~~	~~DLC-BDP-ZZ-ZZ-RP-MEP-ZZ-0015~~	~~LIGHTING STRATEGY~~	~~Doc.~~	~~A4~~				
Schedules															
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0001	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0001	SCHEDULE OF MAJOR PLANT	Doc.	A4	●	●	●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0002	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0002	AIR HANDLING UNIT SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0003	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0003	SILENCERS SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0004	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0004	FAN SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0005	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0005	FIRE DAMPER SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0006	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0006	GRILLE SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0007	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0007	VRV UNITS SCHEDULE	Doc.	A4			●	
~~DLC~~	~~BDP~~	~~ZZ~~	~~ZZ~~	~~SH~~	~~MEP~~	~~ZZ~~	~~0008~~	~~DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0008~~	~~CHP SCHEDULE~~	~~Doc.~~	~~A4~~			↓	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0009	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0009	OVERDOOR HEATER SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0010	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0010	RADIATOR SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0011	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0011	UNDERFLOOR HEATING SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0012	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0012	PLATE HEAT EXCHANGER SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0013	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0013	GAS CONDENSING BOILER SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0014	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0014	HEATNG PUMPS SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0015	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0015	PRESSURISATION UNIT SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0016	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0016	DHW TANK SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0017	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0017	DHW CALORIFIERS SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0018	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0018	DHW GAS FIRED BOILER SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0019	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0019	DHW PUMP SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0020	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0020	ELECTRICAL EQUIPMENT SCHEUDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0021	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0021	LUMINAIRE SCHEDULE	Doc.	A3			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0022	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0022	EXTERNAL LUMINAIRE SCHEDULE	Doc.	A3			●	

DOCUMENT REFERENCE									MEP DELIVERABLES	SCALE	PAPER SIZE	RIBA STAGE 2 Lite	RIBA STAGE 3 (TBC)	RIBA STAGE 4 (TBC)	COMMENTS
Project	Originator	Zone	Level	Container	Role	Uniclass	Ref.	Document Number (Combined)							
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0023	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0023	HOT WATER RETURN VALVE SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0024	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0024	GAS METER SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0025	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0025	GAS SAFETY PANEL SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0026	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0026	ABOVE GROUND DRAINAGE CONNECTIONS SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0027	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0027	WATER METERS SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0028	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0028	REDUCED PRESSURE ZONE VALVE SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0029	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0029	THERMOSTATIC MIXING VALVE SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0030	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0030	SUBMAIN CABLE SCHEDULE	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0031	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0031	DISTRIBUTION BOARD SCHEDULES	Doc.	A4			●	
DLC	BDP	ZZ	ZZ	SH	MEP	ZZ	0032	DLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0032	FIRE ALARM CAUSE & EFFECT	Doc.	A4			●	

Appendix B – Basis of design

GT 3 Architectural Layouts –

- 15042- SK(020) – Ground and First Floors, As Proposed
- 15042- SK(021) – Site Plan, As Proposed
- Area Schedule



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NOTES

REVISION / DESCRIPTION	DRAWN	CHECKED	DATE
P1 - FOR COSTING	AA	AM	08.06.16

KEY PLAN

CLIENT

BDP.

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www.bdp.com

PROJECT TITLE
WHITEFIELD LEISURE CENTRE

WIP

DRAWING TITLE
MEP SERVICES
COMBINED SERVICES PLANT RM
LEVEL - 00

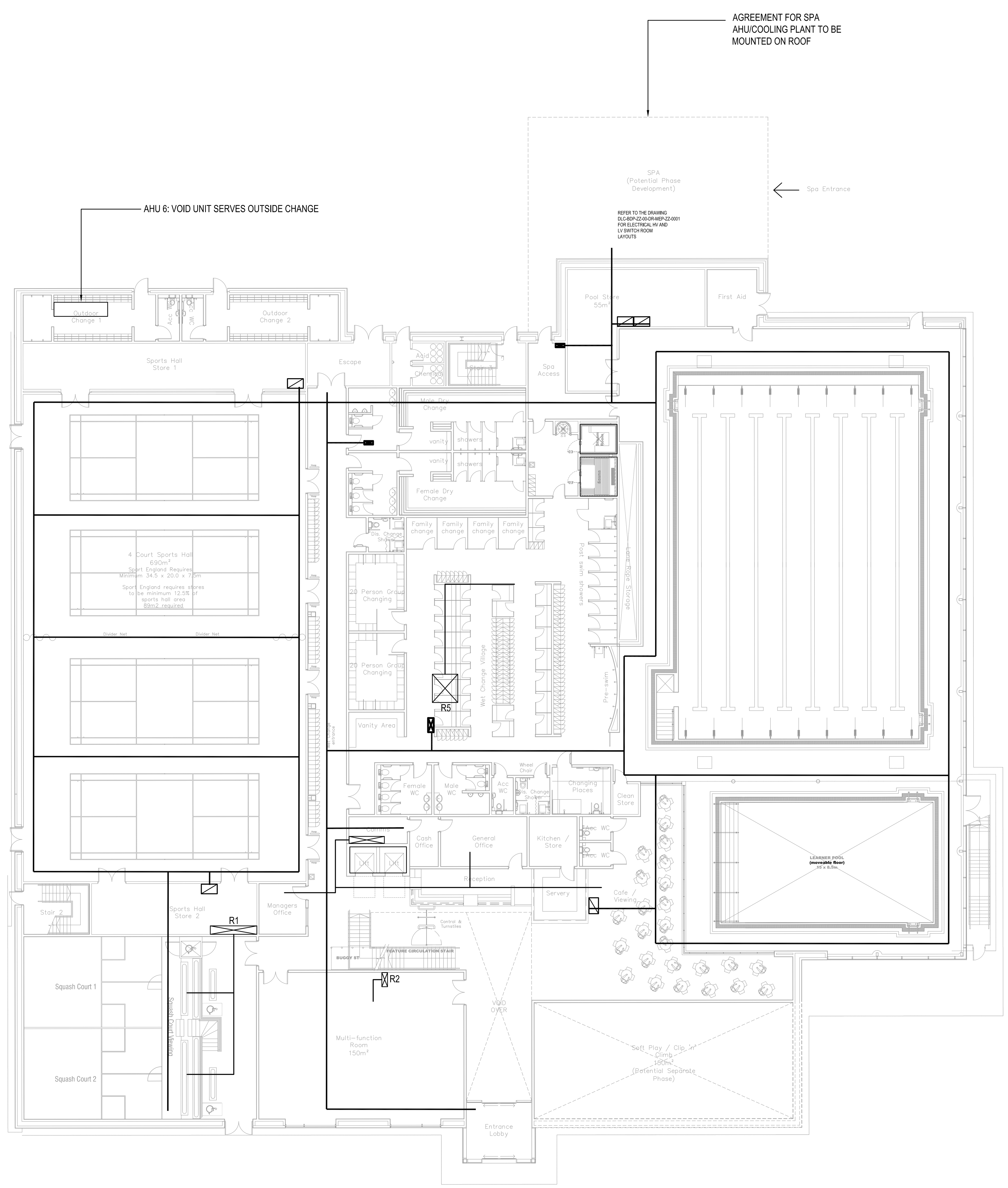
SCALE 1:50 @ A1

DATE 08.06.16

PROJECT NUMBER P2007256

DRAWING No. DLC-BDP-ZZ-00-DR-MEP-ZZ-0001

REVISION P1



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LEGEND:

- VENTILATION
- WINDCATERER
- RISER
- CONTAINMENT
- ELECTRICAL DB

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DRAWING TITLE: MEP SERVICES COMBINED SERVICES ROUTE LEVEL - 00

SCALE: 1:50 @ A1

DATE: 08.06.16

PROJECT NUMBER: P2007256

DRAWING No.: DLC-BDP-ZZ-00-DR-MEP-ZZ-0002

REVISION: P1

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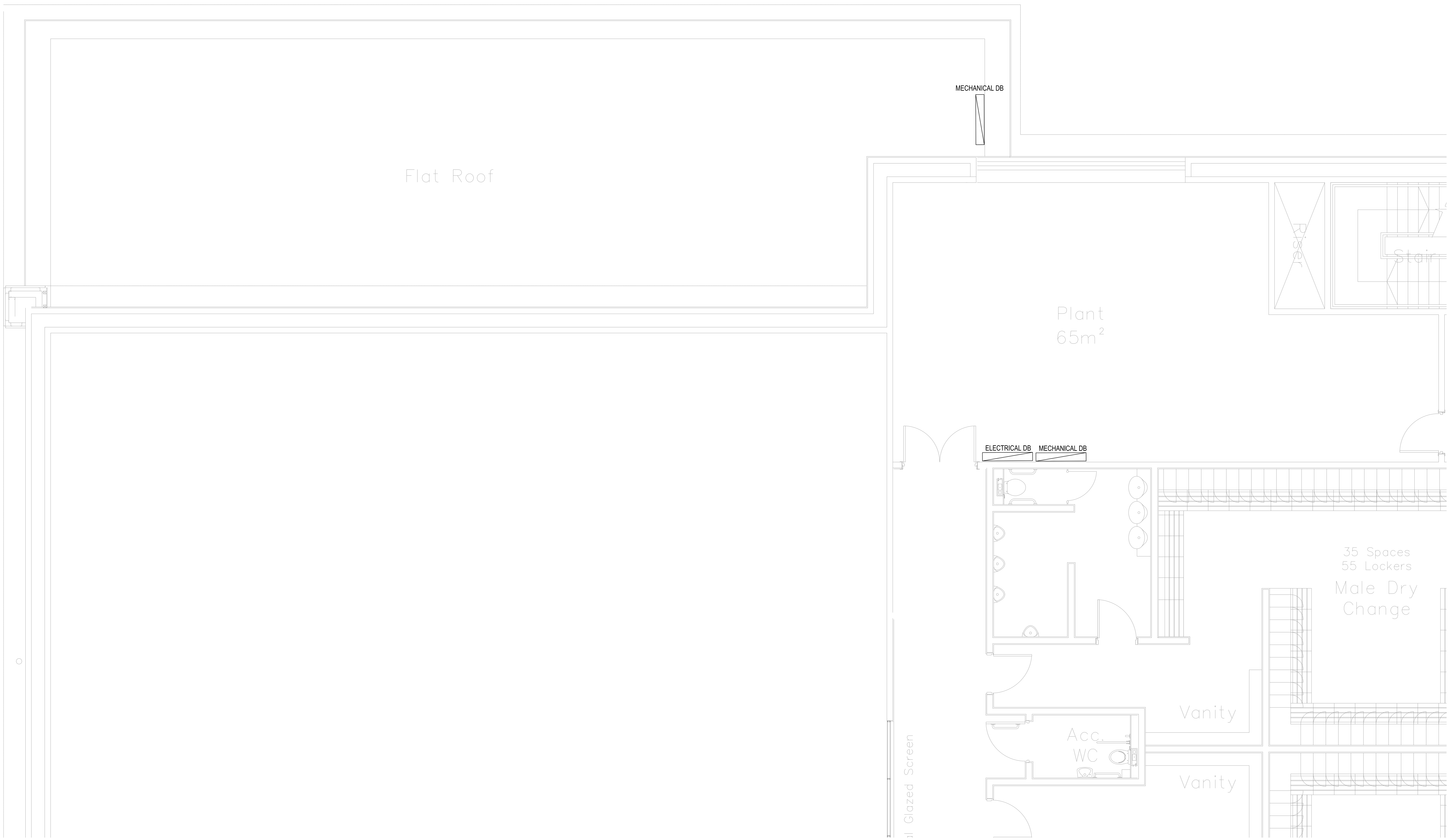

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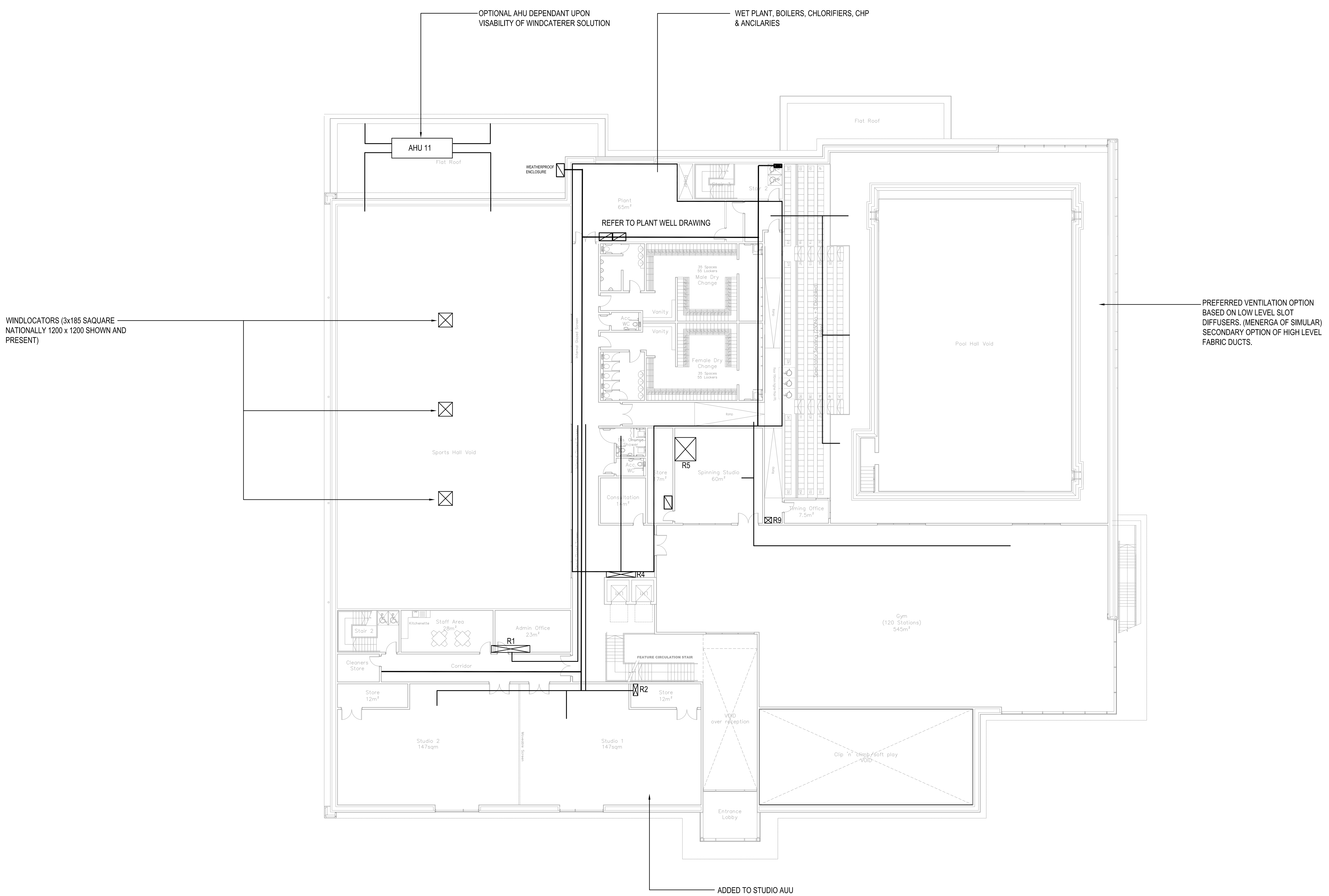
PROJECT TITLE
WHITEFIELD LEISURE CENTRE

WIP

DRAWING TITLE	SCALE
MEP SERVICES COMBINED SERVICES PLANT RM LEVEL - 01	1:50 @ A1 DATE 08.06.16

PROJECT NUMBER	DRAWING No.	REVISION
P2007256	DLC-BDP-ZZ-01-DR-MEP-ZZ-0001	P1



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NOTES

LEGEND:

- VENTILATION
- WINDCATERER
- RISER
- CONTAINMENT
- ELECTRICAL DB

REVISION / DESCRIPTION	DRAWN	CHECKED	DATE
P1 - FOR COSTING	AA	AM	08.06.16

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DRAWING TITLE: MEP SERVICES COMBINED SERVICES ROUTE LEVEL - 01

SCALE: 1:50 @ A1

DATE: 08.06.16

PROJECT NUMBER: P2007256

DRAWING No.: DLC-BDP-ZZ-01-DR-MEP-ZZ-0002

REVISION: P1

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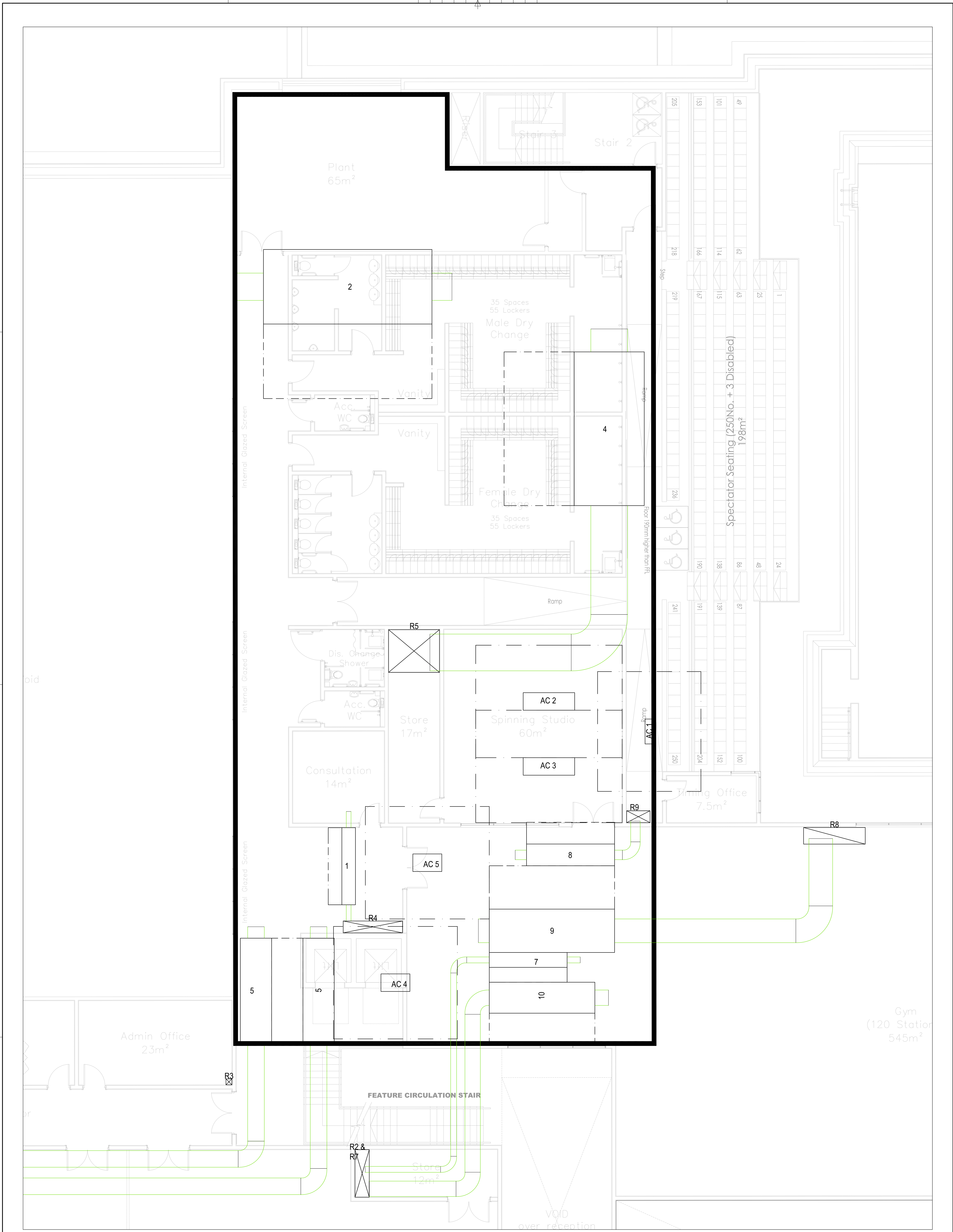

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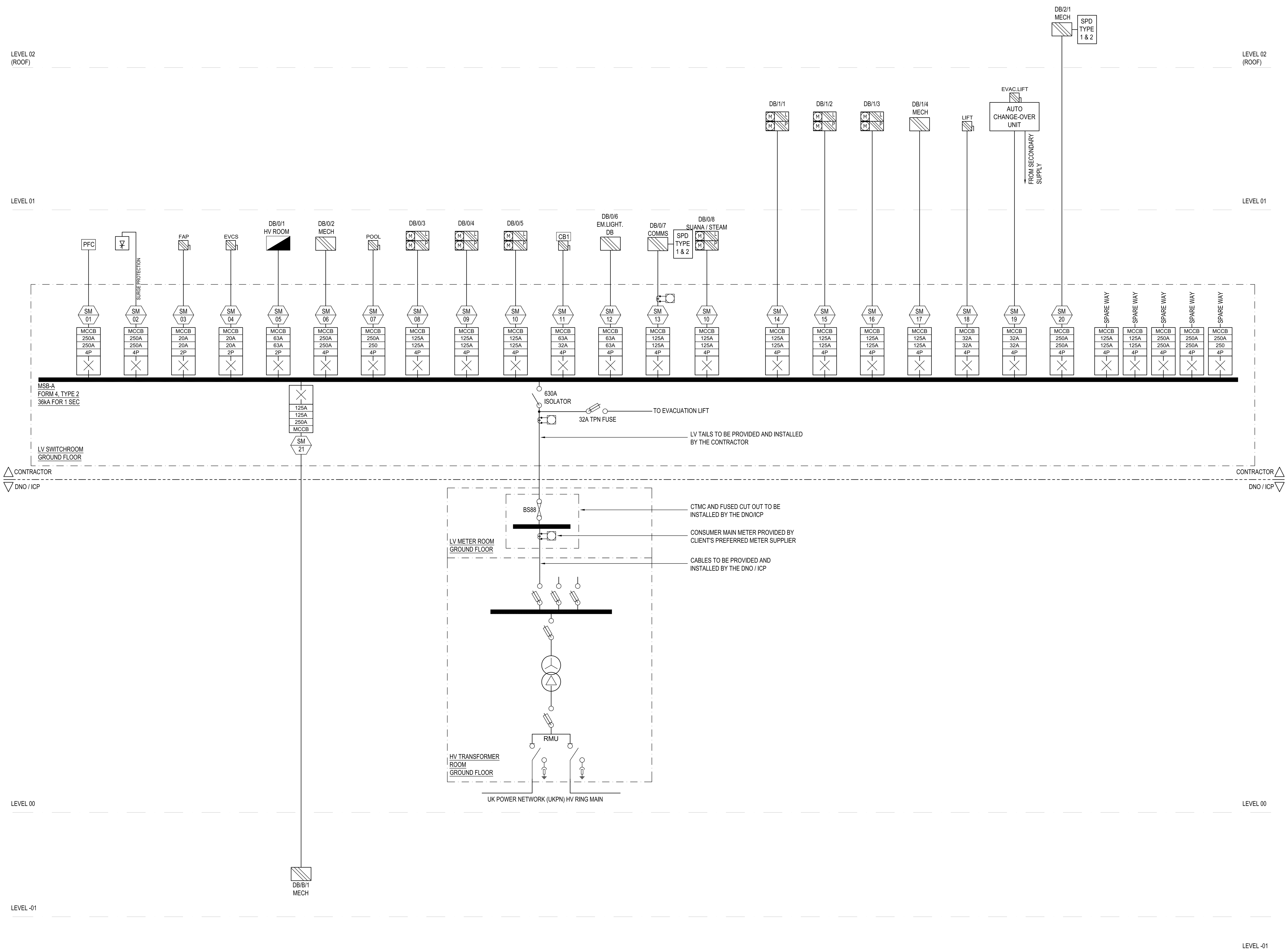
PROJECT	WHITEFIELD LEISURE CENTRE
DRAWING TITLE	MEP SERVICES ROOD TOP AHU COMPOUND LEVEL - ROOF
SCALE	1:50@A0
DATE	08.06.16
JOB NUMBER	P2007256
DRAWING NUMBER	DLC-BDP-ZZ-02-DR-MEP-ZZ-0001
REVISION	P1

P1 FOR COSTING MP AM 08.06.16

LEGEND:
VENTILATION
WINDCATCHER
RISER
PLANTROOM OUTLINE
CLEARANCE ZONE
AC - AIR CONDENSER
AHU - AIR HANDLING UNIT

NOTES:

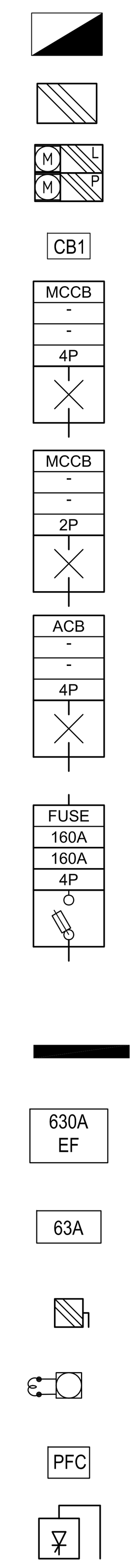
NOTES
BASE DRAWINGS
USED IN COMPILATION OF THIS DRAWING:
Author Drawing No / Rev Date Received



NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS & SPECIFICATIONS
2. ALL METERS SHALL BE CONNECTED TO THE BUILDING BMS/EMS SYSTEM
3. DRAWINGS ARE BASED ON STAGE 2 INFORMATION ONLY. PLANT RATING AND LOAD MAY CHANGE SUBJECT TO DESIGN DEVELOPMENT
4. PANEL BOARD'S / DISTRIBUTION BOARD'S BUSBAR RATING NOT TO BE LOWER THAN THEIR INCOMING PROTECTIVE DEVICES

LEGEND:



- SINGLE PHASE DISTRIBUTION BOARD
- 3 PHASE DISTRIBUTION BOARD
- SPLIT 3 PHASE DISTRIBTION BOARD
- CENTRAL BATTERY UNIT
- MCCB - 4 POLE SCHNEIDER NSX RANGE
- MCCB - 2 POLE SCHNEIDER NS-TMD RANGE
- AIR CIRCUIT BREAKER
- MOTOR RATED FUSED SWITCH
- BUSBAR
- BUSBAR END FEED UNIT C/W PROTECTION DEVICE
- BUSBAR TAP OFF UNIT C/W PROTECTION DEVICE
- 3 PHASE ISOLATOR
- ELECTRIC METER C/W BMS LIINKING
- POWER FACTOR CORRECTION UNIT
- SURGE PROTECTION UNIT

NOTES

BASE DRAWINGS

USED IN COMPILATION OF THIS DRAWING :

Author	Drawing No / Rev	Date Received

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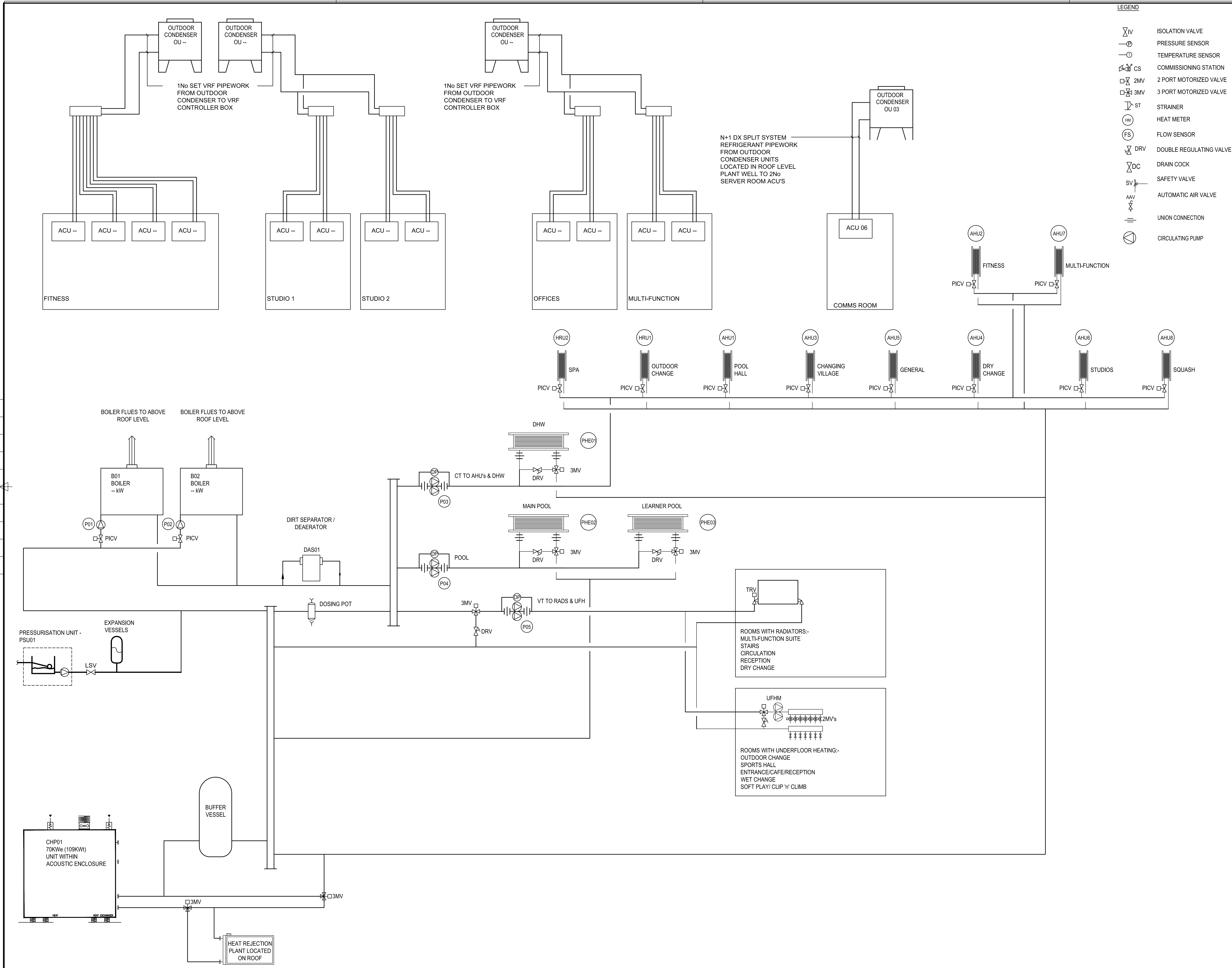
PROJECT

DRAWING TITLE
SCHEMATIC
ELECTRICITY DISTRIBUTION AND TRANSMISSION SYSTEMS

SCALE	DATE	JOB NUMBER	DRAWING NUMBER	REVISION
NTS@A0	08/06/16	P2007256	DLC-BDP-ZZ-ZZ-DR-E-70_30-0001	P1



NOTES

1. ALL SYSTEM LOW POINTS SHALL BE INSTALLED COMPLETE WITH DRAIN POINTS.
2. ALL SYSTEM HIGH POINTS SHALL BE INSTALLED COMPLETE WITH AUTOMATIC AIR UNITS (AAV).
3. THE CONTRACTOR SHALL INSTALL SUFFICIENT COMMISSIONING STATIONS (OR EQUIVALENT) TO PERMIT ALL SYSTEMS TO BE FULLY BALANCED AND COMMISSIONED IN ACCORDANCE WITH RELEVANT PUBLICATIONS BY BSRIA AND CIBSE. DIFFERENTIAL PRESSURE REDUCING VALVES TO BE USED ON RADIATOR BRANCH LEGS WHERE TRV WILL BE EXPOSED TO PRESSURES IN EXCESS OF 30kPa.
4. ALL FINAL CONNECTIONS TO HEAT EMITTERS ARE TO BE 15mm FLOW AND RETURN UNLESS STATED OTHERWISE ON DRAWING.
5. ALL RADIATORS TO HAVE DOUBLE REGULATING TRV CONTROL.
6. ALL HIDDEN PIPEWORK TO BE INSULATED.
7. ALL RADIATORS TO BE CONNECTED TO THE VARIABLE TEMPERATURE HEATING CIRCUIT (VT HEATING)
8. IDENTICAL PIPELINE SIZES APPLY FOR BOTH FLOW AND RETURN PIPEWORK.
9. ALL BRANCHES TO HAVE ISOLATION VALVES
10. THE UNDERFLOOR HEATING ZONES SHALL BE DEVELOPED BY THE UNDERFLOOR HEATING SPECIALIST AND ARE TO INCLUDE ALL NECESSARY PIPE COILS AND TO CO-ORDINATE WITH ANY FIXED EQUIPMENT OR FURNITURE.
11. THE UNDERFLOOR HEATING SPECIALIST SHALL BE RESPONSIBLE FOR SURVEYING THE STRUCTURAL FLOOR SLAB AND CONFIRMING ITS SUITABILITY PRIOR TO COMMENCING WORKS

REVISION	DESCRIPTION	DRAWN	CHECKED	DATE
P1	FIRST ISSUE	AM	SM	16.06.16

KEY PLAN

CLIENT

BDP.

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PROJECT TITLE
DOVER
LEISURE CENTRE

DRAWING TITLE
SCHEMATIC - HEATING , COOLING AND REFRIGERATION SYSTEMS

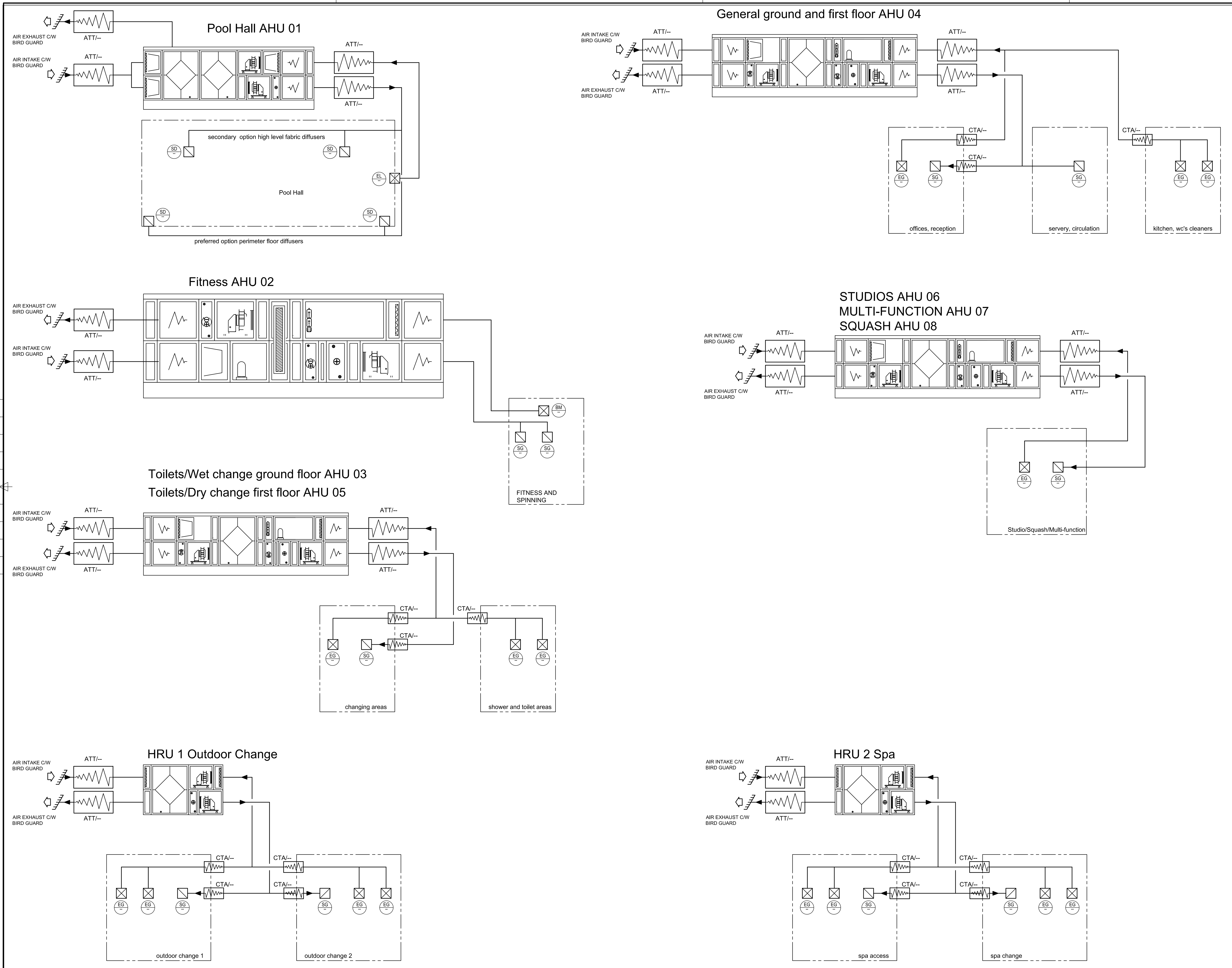
SCALE NTS @ A1

DATE JUN '16

PROJECT NUMBER P2007256

DRAWING No. DLC-BDP-ZZ-ZZ-DR-M-60-0001

REVISION P1



ALL DIMENSIONS SHOULD BE CHECKED ON SITE.

DO NOT SCALE FROM THIS DRAWING.

ANY DRAWING ERRORS OR DIVERGENCES SHOULD BE BROUGHT TO THE ATTENTION OF BUILDING DESIGN PARTNERSHIP AT THE ADDRESS SHOWN BELOW.

NOTES

1. THE CONTRACTOR SHALL INSTALL SUFFICIENT VOLUME CONTROL DAMPERS TO PERMIT ALL SYSTEMS TO BE FULLY BALANCED AND COMMISSIONED IN ACCORDANCE WITH RELEVANT PUBLICATIONS BY BSRIA AND CIBSE.
2. ALL DUCTWORK TO BE INSULATED, WHERE THE DUCT IS EXTERNAL THEN THE INSULATION SHALL BE WEATHERPROOFED WITH A SYSTEM THAT IS NOT SUSCEPTIBLE TO EITHER VERMIN OR SEAGULLS/BIRDS.
3. EXTERNAL AIR HANDLING UNITS SHALL BE PROVIDED WITH ROOFS AND WITH ROOF PRO OR SIMILAR RAISED ACCESS SYSTEM FOR ROOF MAINTENANCE.
4. WHERE POSSIBLE AIR INTAKES AND AIR DISCHARGES SHALL BE SEPARATED BY AT LEAST 10M. AIR INTAKES SHALL BE AT LEAST 20M FROM EXTERNAL POLLUTION SOURCES (CARS, FLUES, ETC).
5. DUCTWORK SHALL BE FIRE RATED WHERE IT PASSES THROUGH FIRE ESCAPE ROUTES.
6. POOL HALL VENTILATION IS TO BE TREATED INTERNALLY AND EXTERNALLY TO REDUCE THE RISK OF CORROSION FROM THE POOL ENVIRONMENT.
7. ALL AIR HANDLING PLANT SHALL CONFORM TO THE LATEST EU DIRECTIVE AND MEET THE FUTURE 2018 REQUIREMENTS AS A MINIMUM.

REVISION - DESCRIPTION		DRAWN	CHECKED	DATE
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DRAWING TITLE
SCHEMATIC - VENTILATION AND AIR CONDITIONING SYSTEMS

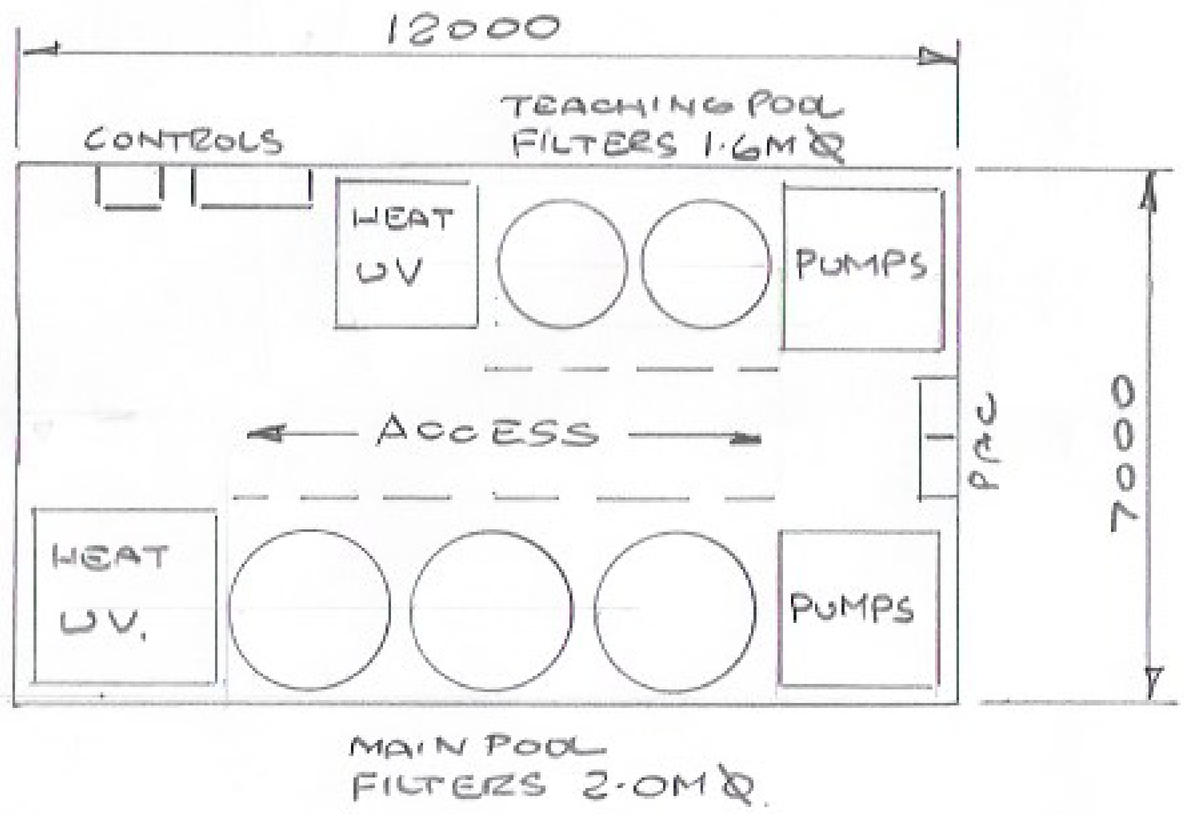
SCALE NTS @ A1

DATE JUN '16

PROJECT NUMBER P2007256

DRAWING No. DLC-BDP-ZZ-ZZ-DR-M-65-0001

REVISION P1



SLOUGH LEISURE CENTRE

FILTRATION PLANTROOM

SLOU - 01

Whitefield Leisure Centre

Schedule of Major Plant

Job No: P2007256
Doc No: WLC-BDP-ZZ-ZZ-SH-MEP-ZZ-0001
Issue: Stage 2 lite
Rev: P01
Date: 08 June 2016

BDP.

Issue Status

Revision	Description	Issued by	Date	Checked
P01	Stage 2 Issue	AM	08-06-2016	SM

Schedule of Major M+E Plant Items

Plant Item/ Specification	Load / Duty / Capacity/Size	Quantity	Manufacturer Preliminary design based on	Location	Comments
Rainwater harvesting tank 15,000 litres [requires assessment from BREEAM calculator to determine final capacity] May be a Sport England funding requirement	1.8m dia x 8m	1 No.	Monsoon or equivalent	External buried	One piece moulded tank with access manholes for inspection, inlet chamber with filter, weir and discharge chamber complete with suction connection and all level controls
Rainwater filter unit and tank	1.5m x 1.5m x 1.2m	1 No.	Monsoon or equivalent	External buried	One piece tank with access chamber enclosing a leaf filter unit
Rainwater booster set and control panel	TBC	1 No	Monsoon or equivalent	Basement plantroom	Sufficient to supply all toilet flush cisterns
Sump pumps		1 No.?		Basement plantroom	Depending on invert levels but expect at least the basement should have a sump pump. Possible that the buried rainwater and backwash tanks will need sump pumps externally
Mains cold feed into the building using protectaline or similar barrier pipe				Buried boundary to basement	Unknown ground condition will require barrier pipe unless there is some assessment that mains will remain potable
Main Cold Water Storage Tank. 4,000 litres	2.0m x 1.5m x 1.5m high	1 No.	Nicholson plastics	Basement Plantroom	GRP sectional divided tank with ball valve housings screened warning pipe and overflow, low level alarm. Tanks shall comply with Water Supply Regulations and Amendment 1999, BS EN 13280. Tank mounted on frame over cold water booster set.
Main Cold water booster set.	Flow rate: TBC	1 set.	Grundfos/ Pressmain	Basement plantroom	Three inverter driven pumps - duty, assist, standby, skid mounted with control panel. Change over on run and standby pumps, variable speed driven pumps to meet safety requirements of BS EN 61800-5-1, integral controls and suitable for BMS link. Pumps manufactured and tested in accordance with BS EN 809, BS EN 60335-2-41
Cat 5 booster set and break tank	1.1 l/s at 2.7 bar	1 set	Arrow boost-a-break	Basement plantroom	Serves all hose bib taps
Water conditioning unit	1.5l/s	2no.	Hydromag	Basement plantroom	To serve the Heating and hot water generation units with treated water to prevent scale formation
Hot Water storage vessel + plate heat exchanger	4000 litres/ 1350 dia 3050 high 900 x 450 x 1800 high PHE	1No storage vessel 1 No PHE	Ormandy – Rycroft/ CHWL	First floor Plantroom	Pre-Insulated stainless steel cylinder with plate heat exchanger capable of 1 hour recovery

Plant Item/ Specification	Load / Duty / Capacity/Size	Quantity	Manufacturer Preliminary design based on	Location	Comments
Gas fired, high efficiency condensing boilers	850 kW(TBC)/ 750 w x 2200 deep x 2100 high	2 No. each at 66% duty	Remeha / EvoMod modular boilers	First floor Plantroom	
Gas CHP	70 kWe / 109 KW (Thermal) 3300 x 1200 x 2400high	1 No.	EnerG/ Hoval Powerbloc	First floor Plantroom	Note alternative option for 2 No. SAV loadtracker units
Air Source Heat Pump – VRF Outdoor Unit	118 KW Cooling(TBC) 61 KW Heating(TBC) 4300 x 760 x 1710 high	1 No.	Mitsubishi/ Daikin	2nd Floor Roof Plant well	Serving Fitness suite
Air Source Heat Recovery – VRF Outdoor Unit	69 KW Cooling(TBC) 75 KW Heating(TBC) 3100 x 760 x 1710 high	1 No.	Mitsubishi/ Daikin	2nd Floor Roof Plant well	Serving studio 1 & 2, multi-function space and general office areas
Power Inverter Heat Pump – wall mount split system	4.5 KW Cooling(TBC) 0.5 KW Heating(TBC)	2 No.	Mitsubishi/ Daikin	2nd Floor Roof Plant well	Serving comms room on duty and standby
LTHW - Packaged pressurisation unit and expansion vessel with control system.	TBC	1 No.	TBC	First floor Plantroom	c/w expansion vessels, integral control panel and twin pumps. Heating circuits.
CHP - Packaged pressurisation unit and expansion vessel with control system.	TBC	1 No.	TBC	First floor Plantroom	c/w expansion vessels, integral control panel and twin pumps. Heating circuits.
CHP – LTHW Buffer Vessels	2000 litres(TBC)	1 No.	TBC	First floor Plantroom	
CHP- heat rejection unit	110kW 1200 x 1200 x 1300 high	1 No.	TBC	2nd Floor Roof Plant well	
Underfloor heating in the Leisure Centre	Size TBC	TBC	TBC	Ground Floor	Serves sports hall, general circulation, changing areas, pool surround
Primary HTG pumps to serve gas fired boilers	Size TBC	2 No. single head inverter driven	TBC	First floor plantroom	Single head pumps c/w variable speed drives

Plant Item/ Specification	Load / Duty / Capacity/Size	Quantity	Manufacturer Preliminary design based on	Location	Comments
Primary HTG pumps to serve CHP	Size TBC	1No.single head inverter driven	TBC	First floor plantroom	Single head pumps c/w variable speed drives
Secondary HTG pumps to serve CHP	Size TBC	2No.single head inverter driven	TBC	First floor plantroom	Single head pumps c/w variable speed drives to serve plate heat exchanger (domestic hot water system) plate heat exchanger (return LTHW heating circuit)
CT HTG pumps for AHU's	Size TBC	1 No. Twin Head, Inverter driven	TBC	First floor plantroom	Variable speed pump with remote variable speed drive. Pumps manufactured and tested in accordance with BS EN 809, BS EN 60335-2-41
CT HTG pumps for Pool	Size TBC	1 No. Twin Head, Inverter driven	TBC	First floor plantroom	Variable speed pump with remote variable speed drive. Pumps manufactured and tested in accordance with BS EN 809, BS EN 60335-2-41
VT HTG pumps for underfloor heated areas.	Size TBC	1 No. Twin Head, Inverter driven	TBC	First floor plantroom	Variable speed pumps with remote variable speed drive. Pumps manufactured and tested in accordance with BS EN 809, BS EN 60335-2-41
Fan Coil Units to serve Fitness studio	10 KW (Cooling) TBC	Approx 12No	TBC	Local to Room	Final quantity to be confirmed
Fan Coil Units to serve studios	4 KW (Cooling) TBC	Approx 6No	TBC	Local to Room	Final quantity to be confirmed
Fan Coil Units to serve multi-function suite	4 KW (Cooling) TBC	Approx 2No	TBC	Local to Room	Final quantity to be confirmed
Fan Coil Units to serve offices	3.2 KW (Cooling) TBC	Approx 6No	TBC	Local to Room	Final quantity to be confirmed
Wall Mounted DX Split to serve comms room	4.5 KW (Cooling) TBC	2No (duty/ standby)	TBC	Local to Room	Final quantity to be confirmed
AHU 02- Pool Hall	8.4 m3/s Supply + 8.4 m3/s Extract @ 300 pa (c/w heat recovery Plate Heat exchange, bag filters, heating coil + Inverter driven fans, mixing box	1 No.	Recotherm	2nd Floor External Roof Plantroom	Motorised dampers. Filters to be F7. Channel base frame to be 300mm high. Re-circulation box required. Units shall be suitable for external mounting, c/w AV mounts external to unit. Air Handling Units shall be to BS EN 1886: 1998 Units to be suitable for pool chlorine environment
AHU 09- Fitness suite	2.7 m3/s Supply + 2.1 m3/s Extract @ 350 pa: frost coil, heat recovery unit c/w heat recovery unit thermal wheel, bag filters, heating coil + integral dx cooling coil (heat pump system), Inverter driven fans (Heating 70F 50R).	1 No.	Air source (Tempair)	2nd Floor External Roof Plantroom	Motorised dampers. Filters to be F7. Channel base frame to be 300mm high. Re-circulation box required. Units shall be suitable for external mounting, c/w AV mounts external to unit. Air Handling Units shall be to BS EN 1886: 1998

Plant Item/ Specification	Load / Duty / Capacity/Size	Quantity	Manufacturer Preliminary design based on	Location	Comments
AHU 04 - Changing Village, Pool Store, Toilets, Dry change & Viewing Area/Corridor	7.4 m3/s Supply + 7.4 m3/s Extract @ 350 pa: frost coil, heat recovery unit c/w heat recovery unit thermal wheel, bag filters, heating coil + integral dx cooling coil (heat pump system), Inverter driven fans (Heating 70F 50R).	1 No.	Air source (Tempair)	2nd Floor External Roof Plantroom	Motorised dampers. Filters to be F7. Channel base frame to be 300mm high. Re-circulation box required. Units shall be suitable for external mounting, c/w AV mounts external to unit. Air Handling Units shall be to BS EN 1886: 1998
AHU 01- Café, general office, circulation ground floor	0.2 m3/s Supply + 0.2 m3/s Extract @ 350 pa c/w frost coil, heat recovery unit thermal wheel, bag filters, heating coil + integral dx cooling coil (heat pump system), inverter driven fans (Heating 70F 50R).	1 No.	Air source (Tempair)	2nd Floor External Roof Plantroom	Motorised dampers. Filters to be F7. Channel base frame to be 300mm high. Re-circulation box required. Units shall be suitable for external mounting, c/w AV mounts external to unit. Air Handling Units shall be to BS EN 1886: 1998
AHU 10 - Studios	1.3 m3/s Supply + 1.3 m3/s Extract @ 350 pa c/w frost coil, heat recovery unit thermal wheel, bag filters, heating coil + integral dx cooling coil (heat pump system), inverter driven fans (Heating 70F 50R).	1 No.	Air source (Tempair)	2nd Floor External Roof Plantroom	Motorised dampers. Filters to be F7. Channel base frame to be 300mm high. Re-circulation box required. Units shall be suitable for external mounting, c/w AV mounts external to unit. Air Handling Units shall be to BS EN 1886: 1998
AHU 07- Multi-function suite	0.25 m3/s Supply + 0.25 m3/s Extract @ 350 pa c/w frost coil, heat recovery unit thermal wheel, bag filters, heating coil + integral dx cooling coil (heat pump system), inverter driven fans (Heating 70F 50R).	1 No.	Air source (Tempair)	2nd Floor External Roof Plantroom	Motorised dampers. Filters to be F7. Channel base frame to be 300mm high. Re-circulation box required. Units shall be suitable for external mounting, c/w AV mounts external to unit. Air Handling Units shall be to BS EN 1886: 1998
AHU 05- Squash courts	1.3 m3/s Supply + 1.3 m3/s Extract @ 350 pa c/w frost coil, heat recovery unit thermal wheel, bag filters, heating coil + integral dx cooling coil (heat pump system), inverter driven fans (Heating 70F 50R).	1 No.	Air source (Tempair)	2nd Floor External Roof Plantroom	Motorised dampers. Filters to be F7. Channel base frame to be 300mm high. Re-circulation box required. Units shall be suitable for external mounting, c/w AV mounts external to unit. Air Handling Units shall be to BS EN 1886: 1998

Plant Item/ Specification	Load / Duty / Capacity/Size	Quantity	Manufacturer Preliminary design based on	Location	Comments
HRU 01- Outdoor change	0.8 m3/s Supply + 0.8 m3/s Extract @ 200 pa c/w frost coil, heat recovery unit PHE, bag filters, heating coil , inverter driven fans (Heating 70F 50R).	1 No.	Air source	2nd Floor External Roof Plantroom	Motorised dampers. Filters to be F7. Unit suitable for installation in ceiling void. Air Handling Units shall be to BS EN 1886: 1998
HRU 02- Spa	1.58 m3/s Supply + 1.58 m3/s Extract @ 200 pa c/w frost coil, heat recovery unit PHE, bag filters, heating coil , inverter driven fans (Heating 70F 50R).	1 No.	Air source	2nd Floor External Roof Plantroom	Motorised dampers. Filters to be F7. Unit suitable for installation in ceiling void. Air Handling Units shall be to BS EN 1886: 1998
Monodraught/ windcatcher	1.5 ach-1	6 No	Monodraught	Sports hall roof	Natural ventilation to sports hall, volumes, size and number of windcatchers yet to be assessed
Plate heat exchangers for CHP serving LTHW circuits	Size TBC	1 No.	HRS	First floor plantroom	
Overdoor Heaters	TBC	1 No.	Biddle	Main Ground Doors	Electric sourced unit.
Gas meter/governer kiosk	1100kW circa 1000 x 600 x 1200 high	1No	British Gas	Site boundary	Utility and shipper supply items
Transformer / HV Switchgear	TBC by appointed Sub-contractor.	1 No	UKPN preferred supplier / manufacturer.	Site boundary	Sub-station to be owned and operated by UK Power Network (UKPN).
Main LV switchboard with Transient Surge Protection and Automatic Power Factor Correction.	Form 3b, Type 2	1 No.	Schneider Electric.	Ground Floor Plantroom	M&E Contractor to nominate preferred manufacturer
Emergency lighting cubicle	5kVA	1 No	Eton Cooper	Ground Floor Plantroom	M&E Contractor to nominate preferred manufacturer
MCB Boards	Type B	As required	Schneider Electric.	Plantrooms, Switch Cupboards and Store Rooms	M&E Contractor to nominate preferred manufacturer
Mechanical Control Panel basement floor	TBC	As required	BMS contractor to name preferred supplier	Plant Rooms	M&E Contractor to nominate preferred manufacturer
Mechanical Control Panel first floor	TBC	As required	BMS contractor to name preferred supplier	Plant Rooms	M&E Contractor to nominate preferred manufacturer
Mechanical Control Panel roof	TBC	As required AHU and roof plant	BMS contractor to name preferred supplier	Plant Rooms	M&E Contractor to nominate preferred manufacturer

Plant Item/ Specification	Load / Duty / Capacity/Size	Quantity	Manufacturer Preliminary design based on	Location	Comments
Mechanical Control Panel roof	TBC	As required Condenser plant	BMS contractor to name preferred supplier	Plant Rooms	M&E Contractor to nominate preferred manufacturer
Comms Cabinet	TBC	01-02	Excel Networking	Dedicated Comms room	M&E Contractor to nominate preferred manufacturer

ALL SPECIALIST POOL PROCESS PLANT TO BE DETAILED, SELECTED AND SIZED BY OTHERS but note requirement for large external attenuation tank for backwash circa 15m3-17m3.

Excludes :-
External irrigation for sports pitches
Commercial Kitchen Extract Fan : assumed to be reheat facility only
Sports Hall Air Handling Unit : Assumes wind catch solution is viable.

Appendix 4 – BREEAM Pre Assessment Report

Whitfield Leisure Centre, Dover - BREEAM NC 2014

09-Jun-16

Credit targeted:
Credit not targeted

Title	Credit Ref	Available Credits	Targeted credits 61.75%	Compliance Requirements	RIBA Stage	Comments and Evidence Requirements
Man 01: Project brief and design						
Stakeholder consultation (project delivery)	Man 01-01	1	1	1. Prior to completion of the Concept Design (RIBA Stage 2 or equivalent), the project delivery stakeholders (see Relevant definitions) have met to identify and define their roles, responsibilities and contributions for each of the key phases of project delivery. 2. In defining the roles and responsibilities for each key phase of the project, the following must be considered: a. End user requirements b. Aims of the design and design strategy c .Particular installation and construction requirements/limitations d. Occupiers budget and technical expertise in maintaining any proposed systems e. Maintainability and adaptability of the proposals f. Requirements for the production of project and end user documentation g. Requirements for commissioning, training and aftercare support. 3. The project team demonstrate how the project delivery stakeholder contributions and the outcomes of the consultation process have influenced or changed the Initial Project Brief, including if appropriate, the Project Execution Plan, Communication Strategy, and the Concept Design.	2	The principal contractor should be one of the project delivery stakeholders. However, as they are rarely appointed this early, this could be a suitably experienced person with substantial construction/contracting experience in similar projects (they could be appointed as a consultant for this stage or a construction project manager).
Stakeholder consultation (third party)	Man 01-02	1	1	4. Prior to completion of the Concept Design stage, all relevant third party stakeholders have been consulted by the design team and this covers the minimum consultation content (see compliance note CN3) 5. The project must demonstrate how the stakeholder contributions and outcomes of the consultation exercise have influenced or changed the Initial Project Brief and Concept Design.	2	It is assumed that this credit will be targeted.
				6. Prior to completion of the detailed design (RIBA Stage 4, Technical Design or equivalent), consultation feedback has been given to, and received by, all relevant parties.	4	
Sustainability Champion (design)	Man 01-03	1	0	8. A Sustainability Champion has been appointed to facilitate the setting and achievement of BREEAM performance target(s) for the project. The design stage Sustainability Champion is appointed to perform this role during the feasibility stage (Stage 1, Preparation and Brief stage, as defined by the RIBA Plan of Work 2013 or equivalent).	1	This credit could be targeted if required.
				9. The defined BREEAM performance target(s) has been formally agreed (see Relevant definitions) between the client and design/project team no later than the Concept Design stage (RIBA Stage 2 or equivalent).	2	
				10. To achieve this credit at the interim design stage assessment, the agreed BREEAM performance target(s) must be demonstrably achieved by the project design. This must be demonstrated via the BREEAM Assessor's design stage assessment report.		
Sustainability Champion (monitoring progress)	Man 01-04	1	0	11. The Sustainability Champion criteria 8, 9 and 10 have been achieved. 12. A Sustainability Champion is appointed to monitor progress against the agreed BREEAM performance target(s) throughout the design process and formally report progress to the client and design team. To do this the Sustainability Champion must attend key project/design team meetings during the Concept Design, Developed Design and Technical Design stages, as defined by the RIBA Plan of Work 2013, reporting during, and prior to, completion of each stage, as a minimum.		This credit could be targeted if required.

Man 02: Life Cycle Cost and Service Life Planning						
Elemental life cycle cost (LCC)	Man 02-01	**2**	**2**	1. An elemental life cycle cost (LCC) analysis has been carried out, at Process Stage 2 (equivalent to Concept Design - RIBA Stage 2) together with any design option appraisals in line with 'Standardised method of life cycle costing for construction procurement' PD 156865:20081. 2. The LCC analysis shows: a. An outline LCC plan for the project based on the building's basic structure and envelope, appraising a range of options and based on multiple cash flow scenarios e.g. 20, 30, 50+ years; b. The fabric and servicing strategy for the project outlining services component and fit-out options (if applicable) over a 15-year period, in the form of an 'elemental LCC Plan'.	2	It is assumed that these credits will be targeted.
Component level LCC Plan	Man 02-02	**1**	**1**	3. A component level LCC plan has been developed by the end of Process Stage 4 (equivalent to Technical Design – RIBA Stage 4) in line with PD 156865:2008 and includes the following component types (where present): a. Envelope, e.g. cladding, windows, and/or roofing b. Services, e.g. heat source cooling source, and/or controls c. Finishes, e.g. walls, floors and/or ceilings d. External spaces, e.g. alternative hard landscaping, boundary protection 4. Demonstrate, using appropriate examples provided by the design team, how the component level LCC plan has been used to influence building and systems design/specification to minimise life cycle costs and maximise critical value.	4	It is assumed that this credit will be targeted.
Capital cost reporting	Man 02-03	**1**	**1**	5. Report the capital cost for the building in pounds per square metre (£k/m2), via the BREEAM Assessment Scoring and Reporting tool, Assessment Issue Scoring tab, Management section. The capital cost for the building includes the expenses related to the initial construction of the building: construction, including preparatory works, materials, equipment and labour; site management; construction financing; insurance and taxes during construction; inspection and testing. Costs relating to land procurement, clearance, design, statutory approvals and post occupancy aftercare should not be included.		This credit can be easily achieved.
Man 03: Responsible Construction Practices						
Pre-requisite	Man 03-pre	**-**	**-**	1. All timber and timber based products used on the project is 'Legally harvested and traded timber' (see Relevant definitions). Note: For other materials there are no pre-requisite requirements at this stage.		This credit is mandatory.
Environmental management	Man 03-01	**1**	**1**	1. The principal contractor operates an environmental management system (EMS) covering their main operations. The EMS must be either: a. third party certified, to ISO 14001/EMAS or equivalent standard; or b. have a structure that is in compliance with BS 8555:2003 and has reached phase four of the implementation stage, 'implementation and operation of the environmental management system', and has completed phase audits one to four, as defined in BS 8555. 2. The principal contractor implements best practice pollution prevention policies and procedures on-site in accordance with Pollution Prevention Guidelines, Working at construction and demolition-sites: PPG61.		It is assumed that this credit will be targeted.
Sustainability Champion (construction)	Man 03-02	**1**	**0**	3. A Sustainability Champion is appointed to monitor the project to ensure ongoing compliance with the relevant sustainability performance/process criteria, and therefore BREEAM target(s), during the Construction, Handover and Close Out stages (as defined by the RIBA Plan of Works 2013, stages 5 and 6).To do this the Sustainability Champion will ideally be site based or will visit the site regularly to carry out spot checks, with the relevant authority to do so and require action to be taken to address shortcomings in compliance. The Sustainability Champion will monitor site activities with sufficient frequency (see compliance note CN6) to ensure that risks of non-compliance are minimised. They will report on progress at relevant project team meetings including identifying potential areas of non-compliance and any action needed to mitigate. 4. The defined BREEAM performance target forms a requirement of the principal contractor's contract (see compliance note Man 01 Project brief and design – CN5 and in Man 01 Project brief and design – Relevant definitions). 5. To achieve this credit at the final post construction stage of assessment, the BREEAM-related performance target for the project must be demonstrably achieved	5	It is assumed that this credit will not be targeted.
Considerate construction	Man 03-03	**2**	**2**	6. Where the principal contractor has used a 'compliant' organisational, local or national considerate construction scheme and their performance against the scheme has been confirmed by independent assessment and verification. The BREEAM credits can be awarded as follows: a. One credit where the contractor achieves 'compliance' with the criteria of a compliant scheme. b. Two credits where the contractor significantly exceeds 'compliance' with the criteria of the scheme. Refer to the Relevant definitions section for a list of compliant schemes and therefore how performance, as determined by a compliant scheme, translates in to BREEAM credits.		It is assumed that these credits will be targeted.

Monitoring of construction-site impacts	Man 03-04	**2**	**2**	7. Responsibility has been assigned to an individual(s) for monitoring, recording and reporting energy use, water consumption and transport data (where measured) resulting from all on-site construction processes (and dedicated off-site monitoring) throughout the build programme. To ensure the robust collection of information, this individual(s) must have the appropriate authority and responsibility to request and access the data required. Where appointed, the Sustainability Champion could perform this role.		It is assumed that these credits will be targeted.
				First Credit - Utility consumption **Energy consumption** 8. Criterion 7 is achieved. 9. Monitor and record data on principal constructor's and subcontractors' energy consumption in kWh (and where relevant, litres of fuel used) as a result of the use of construction plant, equipment (mobile and fixed) and site accommodation. 10. Report the total carbon dioxide emissions (total kgCO2/project value) from the construction process via the BREEAM Assessment Scoring and Reporting tool. Water consumption 11. Criterion 7 is achieved. 12. Monitor and record data on principal constructor's and subcontractors' potable water consumption (m3) arising from the use of construction plant, equipment (mobile and fixed) and site accommodation. 13. Using the collated data report the total net water consumption (m3), i.e. consumption minus any recycled water use, from the construction process via the BREEAM Assessment Scoring and Reporting tool.		
				Second Credit - Transport of construction materials and waste 14. Criterion 7 is achieved. 15. Monitor and record data on transport movements and impacts resulting from delivery of the majority of construction materials to site and construction waste from site. As a minimum this must cover: a. Transport of materials from the factory gate to the building site, including any transport, intermediate storage and distribution. See Relevant definitions. b. Scope of this monitoring must cover the following as a minimum: i. Materials used in major building elements (i.e. those defined in BREEAM issue Mat 01 Life cycle impacts), including insulation materials. ii. Ground works and landscaping materials. c. Transport of construction waste from the construction gate to waste disposal processing/recovery centre gate. Scope of this monitoring must cover the construction waste groups outlined in the project's waste management plan. 16. Using the collated data, report separately for materials and waste, the total fuel consumption (litres) and total carbon dioxide emissions (kgCO2 eq), plus total distance travelled (km) via the BREEAM Assessment Scoring and Reporting tool.		
Exemplary level criteria	Man 03-Ex	**1**	**0**	17. With reference to the considerate construction criterion 7, in addition to meeting the criteria for two credits, the contractor achieves compliance with the criteria of the compliant scheme to an exemplary level of practice.		This credit could be targeted if required.
Man 04: Commissioning and handover						
Commissioning and testing schedule and responsibilities	Man 04-01	**1**	**1**	1. A schedule of commissioning and testing that identifies and includes a suitable timescale for commissioning and re-commissioning of all complex and non-complex building services and control systems and testing and inspecting building fabric.		It is assumed that this credit will be targeted.
				2. All commissioning activities are carried out in accordance with current Building Regulations, BSRIA1 and CIBSE2 guidelines and/or other appropriate standards, where applicable. Where a building management system (BMS) is specified, refer to compliance note CN5 on BMS commissioning procedures.		
				3. An appropriate project team member(s) is appointed to monitor and programme pre-commissioning, commissioning, testing and, where necessary, re-commissioning activities on behalf of the client.		
				4. The principal contractor accounts for the commissioning and testing programme, responsibilities and criteria within their budget and main programme of works, allowing for the required time to complete all commissioning and testing activities prior to handover.		
Commissioning building services	Man 04-02	**1**	**1**	5. For buildings with complex building services and systems, a specialist commissioning manager is appointed during the design stage (by either the client or the principal contractor) with responsibility for: a. Undertaking design reviews and giving advice on suitability for ease of commissioning. b. Providing commissioning management input to construction programming and during installation stages. c. Management of commissioning, performance testing and handover/post-handover stages. Where there are simple building services, this role can be carried out by an appropriate project team member (see criterion 3), provided they are not involved in the general installation works for the building services system(s)		It is assumed that this credit will be targeted.

Testing and inspecting building fabric	Man 04-03	**1**	**1**	6. The commissioning and testing schedule and responsibilities credit is achieved.		It is assumed that this credit will be targeted.
				7. The integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths is quality assured through completion of post construction testing and inspection. Dependent on building type or construction, this can be demonstrated through the completion of a thermographic survey as well as an air tightness test and inspection (see compliance notes CN6 and CN7. The survey and testing is undertaken by a Suitably Qualified Professional (see Relevant definitions) in accordance with the appropriate standard.		
				8. Any defects identified in the thermographic survey or the air tightness testing reports are rectified prior to building handover and close out. Any remedial work must meet the required performance characteristics for the building/element.		
Handover	Man 04-04	**1**	**1**	9. A Building User Guide (BUG) is developed prior to handover for distribution to the building occupiers and premises managers (see Relevant definitions).		It is assumed that this credit will be targeted.
				10. A training schedule is prepared for building occupiers/premises managers, timed appropriately around handover and proposed occupation plans, which includes the following content as a minimum: a. The building's design intent b. The available aftercare provision and aftercare team main contact(s), including any scheduled seasonal commissioning and post occupancy evaluation c. Introduction to, and demonstration of, installed systems and key features, particularly building management systems, controls and their interfaces d. Introduction to the Building User Guide and other relevant building documentation, e.g. design data, technical guides, maintenance strategy, operations and maintenance (O&M) manual, commissioning records, log book etc. e. Maintenance requirements, including any maintenance contracts and regimes in place.		
Man 05: Aftercare						
Aftercare support	Man 05-01	**1**	**1**	1. There is (or will be) operational infrastructure and resources in place to provide aftercare support to the building occupier(s), which includes the following as a minimum: a. A meeting programmed to occur between the aftercare team/individual and the building occupier/management (prior to initial occupation, or as soon as possible thereafter) to: i. Introduce the aftercare team or individual to the aftercare support available, including the Building User Guide (where existing) and training schedule/content. ii. Present key information about the building including the design intent and how to use the building to ensure it operates as efficiently and effectively as possible. b. On-site facilities management training, to include a walkabout of the building and introduction to and familiarisation with the building systems, their controls and how to operate them in accordance with the design intent and operational demands. c. Initial aftercare support provision for at least the first month of building occupation, e.g. on-site attendance on a weekly basis to support building users and management (this could be more or less frequent depending on the complexity of the building and building operations). d. Longer term aftercare support provision for occupants for at least the first 12 months from occupation, e.g. a helpline, nominated individual or other appropriate system to support building users/management.		It is assumed that this credit will be targeted.
				2. There is (or will be) operational infrastructure and resources in place to co-ordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months, once the building is occupied. This is done to facilitate analysis of discrepancies between actual and predicted performance, with a view to adjusting systems and/or user behaviours accordingly.		
Seasonal commissioning	Man 05-02	**1**	**1**	3. The following seasonal commissioning activities will be completed over a minimum 12-month period, once the building becomes substantially occupied: a. Complex systems - Specialist Commissioning Manager: i. Testing of all building services under full load conditions, i.e. heating equipment in mid-winter, cooling/ventilation equipment in mid-summer, and under part load conditions (spring/autumn). ii. Where applicable, testing should also be carried out during periods of extreme (high or low) occupancy. iii. Interviews with building occupants (where they are affected by the complex services) to identify problems or concerns regarding the effectiveness of the systems. iv. Re-commissioning of systems (following any work needed to serve revised loads), and incorporating any revisions in operating procedures into the operations and maintenance (O&M) manuals. b. Simple systems (naturally ventilated) - external consultant/aftercare team/facilities manager: i. Review thermal comfort, ventilation, and lighting, at three, six and nine month intervals after initial occupation, either by measurement or occupant feedback. ii. Take all reasonable steps to re-commission systems following the review to take account of deficiencies identified and incorporate any relevant revisions in operating procedures into the O&M manuals.		It is assumed that this credit will be targeted.

Post occupancy evaluation	Man 05-03	**1**	**1**	4. The client or building occupier makes a commitment to carry out a post-occupancy evaluation (POE) exercise one year after initial building occupation. This is done to gain in-use performance feedback from building users to inform operational processes, including re-commissioning activities, and maintain or improve productivity, health, safety and comfort. The POE is carried out by an independent party (see Man 01 Project brief and design – Relevant definitions) and needs to cover: a. A review of the design intent and construction process (review of design, procurement, construction and handover processes). i. Internal environmental conditions (light, noise, temperature, air quality) ii. Control, operation and maintenance iii. Facilities and amenities iv. Access and layout v. Other relevant issues vi. Sustainability performance (energy/water consumption, performance of any sustainable features or technologies e.g. materials, renewable energy, rainwater harvesting etc.). b. A review of the design intent and construction process (review of design, procurement, construction and handover processes). c. Feedback from a wide range of building users including facilities management on the design and environmental conditions of the building covering: i. Internal environmental conditions (light, noise, temperature, air quality) ii. Control, operation and maintenance iii. Facilities and amenities iv. Access and layout v. Other relevant issues. d. Sustainability performance (energy/water consumption, performance of any sustainable features or technologies e.g. materials, renewable energy, rain- water harvesting etc.).		It is assumed that this credit will be targeted.
				5. The client or building occupier makes a commitment to carry out the appropriate dissemination of information on the building's post-occupancy performance. This is done to share good practice and lessons learned and inform changes in-user behaviour, building operational processes and procedures, and system controls. Refer to compliance notes CN4, CN5 and CN5 for a definition of appropriate dissemination. This also provides advice on appropriate dissemination where the building or building information is commercially or security sensitive.		
Exemplary level criteria	Man 05-Ex	**1**	**1**	The following outlines the exemplary level criteria to achieve one innovation credit for this BREEAM issue: 6. There is (or will be) operational infrastructure and resources in place to co-ordinate the following activities at quarterly intervals for the first three years of building occupation: a. Collection of occupant satisfaction, energy consumption and water consumption data. b. Analysis of the data to check the building is performing as expected and make any necessary adjustments to systems controls or to inform building user behaviours. c. Setting targets for reducing water and energy consumption and monitor progress towards these. d. Feedback any 'lessons learned' to the design team and developer for use in future projects. e. Provision of the actual annual building energy, water consumption and occupant satisfaction data to BRE.		It is assumed that this credit will be targeted.
Hea 01: Visual Comfort						
Glare Control	Hea 01-01	**1**	**0**	1. The potential for disabling glare has been designed out of all relevant building areas using a glare control strategy, either through building form and layout and/or building design measures (see compliance note CN3).		At this early stage it is thought that glare control may not be provided to the reception area.
				2. The glare control strategy avoids increasing lighting energy consumption, by ensuring that: a. The glare control system is designed to maximise daylight levels under all conditions while avoiding disabling glare in the workplace or other sensitive areas. The system should not inhibit daylight from entering the space under cloudy conditions, or when sunlight is not on the facade. AND b. The use or location of shading does not conflict with the operation of lighting control systems.		
Daylighting (building type dependent)	Hea 01-02	**2**	**0**	3. Daylighting criteria have been met using either of the following options: a. The relevant building areas meet good practice daylight factor(s) and other criterion as outlined in Table - 10 and Table - 11. OR b. The relevant building areas meet good practice average and minimum point daylight illuminance criteria as outlined in Table - 12.		Internal spaces will not comply.

View Out	Hea 01-03	**1**	**0**	4. 95% of the floor area in relevant building areas is within 7m of a wall which has a window or permanent opening that provides an adequate view out. 5.The window/opening must be ≥ 20% of the surrounding wall area (refer to Relevant definitions in the Additional information section). Where the room depth is greater than 7m, compliance is only possible where the percentage of window/opening is the same as, or greater than, the values in table 1.0 of BS 8206. 6. In addition, the building type criteria in Table - 13 are applicable to view out criteria.		Internal spaces will not comply.
Internal and external lighting levels, zoning and control	Hea 01-03	**1**	**1**	**Internal Lighting** 7. All fluorescent and compact fluorescent lamps are fitted with high frequency ballasts.		It is assumed that this credit will be targeted.
				8. Internal lighting in all relevant areas of the building is designed to provide an illuminance (lux) level appropriate to the tasks undertaken, accounting for building user concentration and comfort levels. This can be demonstrated through a lighting design strategy that provides illuminance levels in accordance with the SLL Code for Lighting 2012 and any other relevant industry standard.		
				9. For areas where computer screens are regularly used, the lighting design complies with CIBSE Lighting Guide 72 sections 3.3, 4.6, 4.7, 4.8 and 4.9. This gives recommendations highlighting: a. Limits to the luminance of the luminaires to avoid screen reflections. (Manufacturers' data for the luminaires should be sought to confirm this.) b. For uplighting, the recommendations refer to the luminance of the lit ceiling rather than the luminaire; a design team calculation is usually required to demonstrate this. c. Recommendations for direct lighting, ceiling illuminance, and average wall illuminance.		
				External Lighting 10. All external lighting located within the construction zone is designed to provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night. To demonstrate this, external lighting provided is specified in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas3 and BS EN 12464-2:2014 Light and lighting - Lighting of work places - Part 2: Outdoor work places.		
				Zoning and occupant control 11. Internal lighting is zoned to allow for occupant control (see Relevant definitions) in accordance with the criteria below for relevant areas present within the building: a. In office areas, zones of no more than four workplaces b. Workstations adjacent to windows/atria and other building areas separately zoned and controlled c. Seminar and lecture rooms: zoned for presentation and audience areas d. Library spaces: separate zoning of stacks, reading and counter areas e. Teaching space or demonstration area f. Whiteboard or display screen g. Auditoria: zoning of seating areas, circulation space and lectern area h. Dining, restaurant, café areas: separate zoning of servery and seating/dining areas i. Retail: separate zoning of display and counter areas j. Bar areas: separate zoning of bar and seating areas k. Wards or bedded areas: zoned lighting control for individual bed spaces and control for staff over groups of bed spaces l. Treatment areas, dayrooms, waiting areas: zoning of seating and activity areas and circulation space with controls accessible to staff.		
Exemplary level criteria	Hea 01-Ex	**1**	**0**	The following outlines the exemplary level criteria to achieve an innovation credit for daylighting: 14 .Daylighting criteria have been met using either of the following options: a. Relevant building areas meet exemplary daylight factor(s) and the relevant criteria in Table - 15. OR b. Relevant building areas meet exemplary average and minimum point daylight illuminance criteria in Table - 16.		This credit can only be targeted where the daylighting credit has been awarded.

<table>
<tr><th colspan="7">Hea 02: Indoor Air Quality</th></tr>
<tr><td rowspan="4">Minimising Sources of Air Pollution</td><td>Hea 02-01</td><td>1</td><td>1</td><td>An indoor air quality plan has been produced, with the objective of facilitating a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during occupation of the building. The indoor air quality plan must consider the following:
a. Removal of contaminant sources
b. Dilution and control of contaminant sources
c. Procedures for pre-occupancy flush out
d. Third party testing and analysis
e. Maintaining indoor air quality in-use.</td><td></td><td>It is assumed that this credit will be targeted.</td></tr>
<tr><td>Hea 02-02</td><td>1</td><td>0</td><td>The building has been designed to minimise the concentration and recirculation of pollutants in the building as follows:

2. Provide fresh air in to the building in accordance with the criteria of the relevant standard for ventilation.
3. Design ventilation pathways to minimise the build-up of air pollutants in the building, as follows:
a. In air conditioned and mixed mode buildings/spaces: i.
The building's air intakes and exhausts are over 10m apart and intakes are over 20m from sources of external pollution. OR
ii. The location of the building's air intakes and exhausts, in relation to each other and external sources of pollution, is designed in accordance with BS EN 13779:20071 Annex A2.
b. In naturally ventilated buildings/spaces: openable windows/ventilators are over 10m from sources of external pollution.
4. Where present, HVAC systems must incorporate suitable filtration to minimise external air pollution, as defined in BS EN 13779:2007 Annex A3.
5. Areas of the building subject to large and unpredictable or variable occupancy patterns have carbon dioxide (CO2) or air quality sensors specified and:
a. In mechanically ventilated buildings/spaces: sensor(s) are linked to the mechanical ventilation system and provide demand-controlled ventilation to the space.
b. In naturally ventilated buildings/spaces: sensors either have the ability to alert the building owner or manager when CO2 levels exceed the recommended set point, or are linked to controls with the ability to adjust the quantity of fresh air, i.e. automatic opening windows/roof vents.</td><td></td><td>It is assumed that the building will not meet these requirements.</td></tr>
<tr><td>Hea 02-03</td><td>1</td><td>1</td><td>6. All decorative paints and varnishes specified meet the criteria in Table - 18
7. At least five of the seven remaining product categories listed in Table - 18 meet the testing requirements and emission levels criteria for volatile organic compound (VOC) emissions (listed in the table).</td><td></td><td>It is assumed that this credit will be targeted.</td></tr>
<tr><td>Hea 02-04</td><td>1</td><td>1</td><td>8. The formaldehyde concentration level is measured post construction (but pre-occupancy) and is found to be less than or equal to 100μg/averaged over 30 minutes (WHO guidelines for indoor air quality: Selected pollutants, 20102).
9. The total volatile organic compound (TVOC) concentration level is measured post construction (but pre-occupancy) and found to be less than 300μg/over 8 hours, in line with the building regulation requirements.
10. Where VOC and formaldehyde levels are found to exceed the limits defined in criteria 10 and 11, the project team confirms the measures that have, or will be taken, in accordance with the IAQ plan, to reduce the levels to within these limits.
11. The testing and measurement of the above pollutants are in accordance with the following standards where relevant:
a. BS ISO 16000-4: 2011 Diffusive sampling of formaldehyde in air
b. BS ISO 16000-6: 2011 VOCs in air by active sampling
c. BS EN ISO 16017-2: 2003 VOCs - Indoor, ambient and workplace air by passive sampling
d. BS ISO 16000-3: 2011 formaldehyde and other carbonyls in air by pumped sampling.
12. The measured concentration levels of formaldehyde (μg/m3) and TVOC (μg/m3) are reported, via the BREEAM Assessment Scoring and Reporting Tool.</td><td></td><td>It is assumed that this credit will be targeted.</td></tr>
<tr><td>Potential for Natural Ventilation</td><td>Hea 02-05</td><td>1</td><td>0</td><td>13. The building ventilation strategy is designed to be flexible and adaptable to potential building occupant needs and climatic scenarios. This can be demonstrated as follows:

a. Occupied spaces of the building are designed to be capable of providing fresh air entirely via a natural ventilation strategy. The following are methods deemed to satisfy this criterion dependent upon the complexity of the proposed system:
i. Room depths are designed in accordance with CIBSE AM10 (section 2.4) to ensure effectiveness of any natural ventilation system. The openable window area in each occupied space is equivalent to 5% of the gross internal floor area of that room/floor plate. OR
ii. The design demonstrates that the natural ventilation strategy provides adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates. This is demonstrated using ventilation design tool types recommended by CIBSE AM107 (or for education buildings by using the ClassVent tool).

For a strategy which does not rely on openable windows, or which has occupied spaces with a plan depth greater than 15m, the design must demonstrate (in accordance with criterion 13.a.i. above) that the ventilation strategy can provide adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates.

The natural ventilation strategy is capable of providing at least two levels of user-control on the supply of fresh air to the occupied space (see compliance note CN6 for further details).</td><td></td><td>It is assumed that the building is not naturally ventilated.</td></tr>
</table>

2	Exemplary level criteria	Hea 02-Ex	1	0	15. Criterion 6 has been achieved. 16. All seven remaining product categories listed in Table - 18 meet the testing requirements and emission levels criteria for Volatile Organic Compound (VOC) emissions (listed in the table). 17. For products b) – f) listed in Table - 18, the formaldehyde emission levels have been measured and found to be less than or equal to 0.06mg/m3 air in accordance with the approved testing standards in Table - 18.		This credit could be targeted, if required.
			1	0	18. Criterion 6 has been achieved. 19. All seven remaining products categories listed in Table - 18 meet the testing requirements and emission levels criteria for Volatile Organic Compound (VOC) emissions (listed in the table). 20. For products B to F listed in Table - 18, the formaldehyde emission levels have been measured and found to be less than or equal to 0.01mg/m3 air, in accordance with the approved testing standards in Table - 18.		This credit could be targeted, if required.
	Hea 04: Thermal Comfort						
	Thermal Modelling	Hea 04-01	1	1	1. Thermal modelling has been carried out using software in accordance with CIBSE AM11 Building Energy and Environmental Modelling. 2. The software used to carry out the simulation at the detailed design stage provides full dynamic thermal analysis. For smaller and more basic building designs with less complex heating or cooling systems, an alternative less complex means of analysis may be appropriate (such methodologies must still be in accordance with CIBSE AM11). 3. The modelling demonstrates that: a. For air conditioned buildings, summer and winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design2, Table 1.5; or other appropriate industry standard (where this sets a higher or more appropriate requirement/level for the building type). b. For naturally ventilated/free running buildings: i. Winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design, Table 1.5; or other appropriate industry standard (where this sets a higher or more appropriate requirement/level for the building type). ii. The building is designed to limit the risk of overheating, in accordance with the adaptive comfort methodology outlined in CIBSE TM52: The limits of thermal comfort: avoiding overheating in European buildings. 4. For air conditioned buildings, the PMV (predicted mean vote) and PPD (predicted percentage of dissatisfied) indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.		It is assumed that this credit will be targeted.
	Adaptability - for a projected climate change scenario	Hea 04-02	1	0	5. Criteria 1 to 4 are achieved. 6. The thermal modelling demonstrates that the relevant requirements set out in criteria 3 are achieved for a projected climate change environment (see Relevant definitions). 7. Where thermal comfort criteria are not met for the projected climate change environment, the project team demonstrates how the building has been adapted, or designed to be easily adapted in future using passive design solutions in order to subsequently meet the requirements under criterion 6. 8. For air conditioned buildings, the PMV and PPD indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.		It is assumed that these criteria will not be met.

Thermal zoning and controls	Hea 04-03	**1**	**1**	9. Criteria 1 to 4 are achieved 10. The thermal modelling analysis (undertaken for compliance with criteria 1 to 4) has informed the temperature control strategy for the building and its users. 11. The strategy for proposed heating/cooling system(s) demonstrates that it has addressed the following: a. Zones within the building and how the building services could efficiently and appropriately heat or cool these areas. For example consider the different requirements for the central core of a building compared with the external perimeter adjacent to the windows. b. The degree of occupant control required for these zones, based on discussions with the end user (or alternatively building type or use specific design guidance, case studies, feedback) considers: i. User knowledge of building services ii. Occupancy type, patterns and room functions (and therefore appropriate level of control required) iii. How the user is likely to operate or interact with the system(s), e.g. are they likely to open windows, access thermostatic radiator valves (TRV) on radiators, change air-conditioning settings etc., iv. The user expectations (this may differ in the summer and winter) and degree of individual control (i.e. obtaining the balance between occupant preferences, for example some occupants like fresh air and others dislike drafts). c. How the proposed systems will interact with each other (where there is more than one system) and how this may affect the thermal comfort of the building occupants. d. The need or otherwise for an accessible building user actuated manual override for any automatic systems.		It is assumed that this credit will be targeted.
Hea 05: Acoustic Performance						
Acoustic Performance Standards	Hea 05-01	**3**	**1**	1. The building meets the appropriate acoustic performance standards and testing requirements defined in the checklists and tables section which defines criteria for the acoustic principles of: a. Sound insulation b. Indoor ambient noise level c. Reverberation times.		At this early stage it is assumed that at least 1 of the 3 available credits will be targeted.
Hea 06: Safety and Security						
Safe Access	Hea 06-01	**1**	**0**	1. Dedicated cycle paths provide direct access from the site entrance(s) to any cycle storage provided, without the need to deviate from the cycle path and, if relevant, connect to off-site cycle paths (or other appropriate safe route) where these run adjacent to the development's site boundary. 2. Footpaths on-site provide direct access from the site entrance(s) to the building entrance(s) and connect to public footpaths off-site (where existing), providing practical and convenient access to local transport nodes and other off-site amenities (where existing). 3. Where provided, drop-off areas are designed off/adjoining to the access road and provide direct access to pedestrian footpaths, therefore avoiding the need for the pedestrian to cross vehicle access routes. 4. Dedicated pedestrian crossings are provided where pedestrian routes cross vehicle access routes, and appropriate traffic calming measures are in place to slow traffic down at these crossing points. 5. For large developments with a high number of public users or visitors, pedestrian footpaths must be signposted to other local amenities and public transport nodes off-site (where existing). 6. The lighting for access roads, pedestrian routes and cycle lanes is compliant with the external lighting criteria defined in Hea 01 Visual comfort, i.e. in accordance with BS 5489-1:20131 Lighting of roads and public amenity areas. Where vehicle delivery access and drop-off areas form part of the assessed development, the following apply: 7. Delivery areas are not directly accessed through general parking areas and do not cross or share pedestrian and cyclist routes and other outside amenity areas accessible to building users and general public. 8. There is a dedicated parking/waiting area for goods vehicles with appropriate separation from the manoeuvring area and staff and visitor car parking. 9. Parking and turning areas are designed for simple manoeuvring according to the type of delivery vehicle likely to access the site, thus avoiding the need for repeated shunting. 10. There is a dedicated space for the storage of refuse skips and pallets away from the delivery vehicle manoeuvring area and staff/visitor car parking (if appropriate given the building type/function).		It is currently thought that this credit may not be achieved due to limited external space and the possibility that delivery vehicles will access the site through general parking areas / cross pedestrian and cycle paths. This will require confirmation from the design team.

Security of Site and Building	Hea 06-02	**1**	**1**	11. A suitably qualified security specialist (SQSS) conducts an evidence-based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent).	2	It is assumed that this credit will be targeted.
				12. A suitably qualified security specialist (SQSS) develops a set of recommendations or solutions during or prior to Concept Design (RIBA Stage 2 or equivalent). These recommendations or solutions aim to ensure that the design of buildings, public and private car parks and public or amenity space are planned, designed and specified to address the issues identified in the preceding SNA.		
				13. The recommendations or solutions proposed by the suitably qualified security specialist (SQSS) are implemented (see CN9). Any deviation from those recommendations or solutions will need to be justified, documented and agreed in advance with a suitably qualified security specialist.		
Ene 01: Reduction of CO2 emissions - Energy						
	Ene 01-01	**12**	**5**	1. Calculate an Energy Performance Ratio for New Constructions (EPRNC). Compare the EPRNC achieved with the benchmarks in Table - 25 and award the corresponding number of BREEAM credits.		It is thought that at least 5 credits will be awarded.
Exemplary level criteria	Ene 01-Ex	**5**	**0**	2. The building achieves an EPRNC≥ 0.9 and zero net regulated CO2 emissions (see Relevant definitions).		
				3. An equivalent percentage of the buildings modelled 'regulated' operational energy consumption, as stipulated in Table - 26, is generated by carbon neutral on-site or near-site sources and used to meet energy demand from 'unregulated' building systems or processes.		
				4. The building is 'carbon negative' in terms of its total modelled operational energy consumption, including regulated and unregulated energy (see Relevant definitions in the Additional information section of this issue).		
Ene 02: Energy Monitoring						
Sub-metering of major energy consuming systems	Ene 02-01	**1**	**1**	1. Energy metering systems are installed that enable at least 90% of the estimated annual energy consumption of each fuel to be assigned to the various end-use categories of energy consuming systems (see Methodology).		This credit is mandatory for BREEAM 'Very Good'
				2. The energy consuming systems in buildings with a total useful floor area greater than 1,000m2. are metered using an appropriate energy monitoring and management system.		
				3. The systems in smaller buildings are metered either with an energy monitoring and management system or with separate accessible energy sub-meters with pulsed or other open protocol communication outputs, to enable future connection to an energy monitoring and management system (see Relevant definitions).		
				4. The end energy consuming uses are identifiable to the building users, for example through labelling or data outputs		
Sub-metering of high energy load and tenancy areas	Ene 02-02	**1**	**1**	5. An accessible energy monitoring and management system or separate accessible energy sub-meters with pulsed or other open protocol communication outputs to enable future connection to an energy monitoring and management system are provided, covering a significant majority of the energy supply to tenanted areas or, in the case of single occupancy buildings, relevant function areas or departments within the building/unit.		It is assumed that this credit will be targeted.

Ene 03: External Lighting						
	Ene 03-01	**1**	**1**	1. The building has been designed to operate without the need for external lighting (which includes on the building, signs and at entrances).		It is assumed that this credit will be targeted.
				OR alternatively, where the building does have external lighting, one credit can be awarded as follows: 2. The average initial luminous efficacy of the external light fittings within the construction zone is not less than 60 luminaire lumens per circuit Watt.		
				3. All external light fittings are automatically controlled for prevention of operation during daylight hours and presence detection in areas of intermittent pedestrian traffic		
Ene 04: Low carbon design						
Passive design analysis	Ene 04-01	**1**	**1**	1. The first credit within issue Hea 04 Thermal comfort has been achieved to demonstrate the building design can deliver appropriate thermal comfort levels in occupied spaces.		It is assumed that this credit will be targeted.
				2. The project team carries out an analysis of the proposed building design/development to influence decisions made during Concept Design stage (RIBA Stage 2 or equivalent) and identify opportunities for the implementation of passive design solutions that reduce demands for energy consuming building services (see compliance note CN4).	2	
				3. The building uses passive design measures to reduce the total heating, cooling, mechanical ventilation and lighting loads and energy consumption in line with the findings of the passive design analysis and the analysis demonstrates a meaningful reduction in the total energy demand as a result (see compliance note CN16).		
Free Cooling	Ene 04-02	**1**	**0**	4. The passive design analysis credit is achieved.		It is assumed that there will be no free cooling strategy in place.
				5. The passive design analysis carried out under criterion 2 includes an analysis of free cooling and identifies opportunities for the implementation of free cooling solutions.		
				6. The building uses ANY of the free cooling strategies listed in compliance note CN5 to reduce the cooling energy demand, i.e. it does not use active cooling.		
Low and zero carbon feasibility study	Ene 04-03	**1**	**1**	7. A feasibility study has been carried out by the completion of the Concept Design stage (RIBA Stage 2 or equivalent) by an energy specialist (see Relevant definitions) to establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy source(s) for the building/development (see compliance note CN7).	2	It is assumed that this credit will be targeted.
				8. A local LZC technology/technologies has/have been specified for the building/development in line with the recommendations of this feasibility study and this method of supply results in a meaningful reduction in regulated carbon dioxide (CO_2) emissions (see compliance note CN16).		
Ene 06: Energy Efficient Transportation Systems						
Energy Consumption	Ene 06-01	**1**	**1**	1. Where lifts, escalators and/or moving walks (transportation types) are specified: a. An analysis of the transportation demand and usage patterns for the building has been carried out to determine the optimum number and size of lifts, escalators and/or moving walks. b. The energy consumption has been calculated in accordance with BS EN ISO 25745 Energy performance of lifts, escalators and moving walks, Part 2 : Energy calculation and classification for lifts (elevators) and/or Part 3 - Energy calculation and classification for escalators and moving walks, for one of the following: i. At least two types of system (for each transportation type required); OR ii. An arrangement of systems (e.g. for lifts, hydraulic, traction, machine room-less lift (MRL)); OR iii. A system strategy which is 'fit for purpose'. c. The use of regenerative drives should be considered, subject to the requirements in CN6. d. The transportation system with the lowest energy consumption is specified.		It is assumed that this credit will be targeted.
Energy efficient features	Ene 06-02	**2**	**2**	2. Criterion 1 is achieved.		It is assumed that this credit will be targeted.
				LIFTS 3. For each lift, the following three energy efficient features are specified: a. The lifts operate in a standby condition during off-peak periods. For example the power side of the lift controller and other operating equipment such as lift car lighting, user displays and ventilation fans switch off when the lift has been idle for a prescribed length of time. b. The lift car lighting and display lighting provides an average lamp efficacy, (across all fittings in the car) of > 55 lamp lumens/circuit Watt. c. The lift uses a drive controller capable of variable speed, variable-voltage, and variable-frequency (VVVF) control of the drive motor.		
				4. Where the use of regenerative drives is demonstrated to save energy, they are specified.		

Ene 08: Energy Efficient Equipment						
	Ene 08-01	**2**	**2**	1. Identify the building's unregulated energy consuming loads and estimate their contribution to the total annual unregulated energy consumption of the building, assuming a typical/standard specification.		It is assumed that these credits will be targeted.
				2. Identify the systems and/or processes that use a significant proportion of the total annual unregulated energy demand of the development and its operation.		
				3. Demonstrate a meaningful reduction in the total annual unregulated energy demand of the building. See Table - 28.		
Tra 01: Public Transport Accessibility						
	Tra 01-01	**5**	**2**	1. The public transport Accessibility Index (AI) for the assessed building is calculated and BREEAM credits awarded in accordance with the table of building types, AI benchmarks and BREEAM credits in Table - 29 (see checklists and tables).		It is thought that the site will have a low accessibility index.
				2. The Accessibility Index is determined by entering the following information in to the BREEAM Tra 01 calculator: a. The distance (m) from the main building entrance to each compliant public transport node b. The public transport type(s) serving the compliant node e.g. bus or rail c. The average number of services stopping per hour at each compliant node during the operating hours of the building for a typical day (see compliance notes and Table - 30 in the Additional Information section).		
Tra 02: Proximity to Amenities						
	Tra 02-01	**1**	**1**	1. Where the building is located at least 500m safe walking distance from at least 2 of the following amenities: appropriate food outlet, access to cash, access to an outdoor space, access to a recreation facility for leisure or sports, publically available postal facility, community facility, over the counter services associated with a pharmacy, public sector GP surgery or general medical centre, child care facility or school		It is assumed that this credit will be targeted.
Tra 03: Cyclist Facilities						
Cycle storage	Tra 03-01	**1**	**1**	1. Compliant cycle storage spaces that meet the minimum levels set out in Table - 32 are installed. At least 1 space per 10 staff and 1 space per 10 visitors) is required. This number can be reduced by 50% where at least half of the Tra 01 credits are achieved. Numbers are also based on a sliding scale of compliance.		It is assumed that this credit will be targeted.
Cyclist facilities	Tra 03-02	**1**	**1**	2. Criterion 1 has been achieved.		It is assumed that this credit will be targeted.
				3. At least two of the following types of compliant cyclist facilities have been provided for all staff and pupils (where appropriate) (see relevant definitions for the scope of each compliant cyclist facility): a. Showers b. Changing facilities c. Lockers d. Drying spaces .		
Tra 04: Maximum Car Parking Capacity						
	Tra 04-01	**2**	**0**	1. The building's car parking capacity is compared to the maximum car parking capacity benchmarks in Table - 33 and the relevant number of BREEAM credits awarded:		It has been suggested that ample parking will be provided. The credit is therefore likely to be withheld.

Tra 05: Travel Plan						
	Tra 05-01	**1**	**1**	1. A travel plan has been developed as part of the feasibility and design stages. 2. A site specific travel assessment/statement has been undertaken to ensure the travel plan is structured to meet the needs of the particular site and covers the following (as a minimum): a. Where relevant, existing travel patterns and opinions of existing building or site users towards cycling and walking so that constraints and opportunities can be identified. b. Travel patterns and transport impact of future building users. c. Current local environment for walkers and cyclists (accounting for visitors who may be accompanied by young children) d. Disabled access (accounting for varying levels of disability and visual impairment) e. Public transport links serving the site f. Current facilities for cyclists. 3. The travel plan includes a package of measures to encourage the use of sustainable modes of transport and movement of people and goods during the buildings operation and use. 4. If the occupier is known, they must be involved in the development of the travel plan and they must confirm that the travel plan will be implemented post construction and be supported by the buildings management in operation.	0 to 4	It is assumed that this credit will be targeted.
Wat 01: Water Consumption						
	Wat 01-01	**5**	**2**	1. An assessment of the efficiency of the building's domestic water-consuming components is undertaken using the BREEAM Wat 01 calculator. 2. The water consumption (L/person/day) for the assessed building is compared against a baseline performance and BREEAM credits awarded based upon Table - 35. 3. The efficiency of the following 'domestic scale' water-consuming components must be included in the assessment (where specified): a. WCs b. Urinals c. Taps (wash hand basins and where specified kitchen taps and waste disposal unit) d. Showers e. Baths f. Dishwashers (domestic and commercial sized) g. Washing machines (domestic and commercial or industrial sized). The BREEAM Wat 01 calculator defines the building types and activity areas for which the above components must be assessed. 4. Where a greywater and/or rainwater system is specified, its yield (L/person/day) is used to off-set non potable water demand from components that would otherwise be supplied using potable water. 5. Any greywater systems must be specified and installed in compliance with BS 8525-1:2010 Greywater Systems - Part 1 Code of Practice1. Any rainwater systems must be specified and installed in compliance with BS 8515:2009+A1:2013 Rainwater Harvesting Systems - Code of practice		Although only 1 credit is required for 'Very Good', it is thought that at least 2 credits will be targeted.
Exemplary level criteria	Wat 01-Ex	**1**	**0**	The exemplary level credit is awarded where there is a minimum 65% improvement.		
Wat 02: Water Monitoring						
	Wat 02-01	**1**	**1**	1. The specification of a water meter on the mains water supply to each building; this includes instances where water is supplied via a borehole or other private source. 2. Water-consuming plant or building areas, consuming 10% or more of the building's total water demand, are either fitted with easily accessible sub-meters or have water monitoring equipment integral to the plant or area (see Compliance notes). 3. Each meter (main and sub) has a pulsed or other open protocol communication output to enable connection to an appropriate utility monitoring and management system, e.g. a building management system (BMS), for the monitoring of water consumption (see Relevant definitions). 4. If the site on which the building is located has an existing BMS, managed by the same occupier/owner (as the new building), the pulsed/digital water meter(s) for the new building must be connected to the existing BMS.		The specification of a water meter on the mains is mandatory for BREEAM 'Very Good'. It is assumed that this credit will be targeted.

Wat 03: Water Leak Detection and Prevention						
Leak detection system	Wat 03-01	**1**	**1**	1. A leak detection system which is capable of detecting a major water leak on the mains water supply within the building and between the building and the utilities water meter is installed. The leak detection system must be: a. A permanent automated water leak detection system that alerts the building occupants to the leak OR an in-built automated diagnostic procedure for detecting leaks is installed. b. Activated when the flow of water passing through the water meter/data logger is at a flow rate above a pre-set maximum for a pre-set period of time. c. Able to identify different flow and therefore leakage rates, e.g. continuous, high and/or low level, over set time periods. d. Programmable to suit the owner/occupiers' water consumption criteria. e. Where applicable, designed to avoid false alarms caused by normal operation of large water-consuming plant such as chillers.		It is assumed that this credit will be targeted.
Flow control devices	Wat 03-02	**1**	**1**	2. Flow control devices that regulate the supply of water to each WC area/facility according to demand are installed (and therefore minimise water leaks and wastage from sanitary fittings).		It is assumed that this credit will be targeted.
Wat 04: Water Efficient Equipment						
	Wat 04-01	**1**	**1**	1. The design team has identified all unregulated water demands that could be realistically mitigated or reduced.		It is assumed that this credit will be targeted.
				2. System(s) or processes have been identified to reduce the unregulated water demand, and demonstrate, through either good practice design or specification, a meaningful reduction in the total water demand of the building.		
Mat 01: Life Cycle Impacts						
	Mat 01-01	**6**	**3**	1. BREEAM awards credits on the basis of the building's quantified environmental life cycle impact through assessment of the main building elements, as set out in Table - 38		It is thought that at least 3 of the 6 available credits will be awarded.
				2. Credits are awarded on the basis of the total number of points achieved, as set out in Table - 39, and calculated using the BREEAM Mat 01 calculator. This point's score is based on the Green Guide rating(s) achieved for the specifications that make up the main building elements (as in Table - 38).		
				3. Life cycle greenhouse gas emissions (kgCO 2 eq.) for each element are also required to be reported based on a 60-year building life. Where specific data is not available for a product or element, generic data should be used. Generic data can be obtained from the online Green Guide for each element and must be entered in to the BREEAM Mat 01 calculator.		
Exemplary Performance Criteria	Mat 01-Ex	**3**	**0**	4. Where assessing four or more applicable building elements, the building achieves at least two points in addition to the total points required to achieve maximum credits under the standard BREEAM criteria (as outlined in the table above) OR		
				5. Where assessing fewer than four applicable building elements, the building achieves at least one point in addition to the total points required to achieve maximum credits under the standard BREEAM criteria.		
				6. Where the design team has used an IMPACT compliant software tool (or equivalent) to measure the environmental impact of the building.		
				7. Where the design team can demonstrate how the use of an IMPACT compliant software (or equivalent) has benefited the building in terms of measuring and reducing its environmental impact. See CN16		
				8. Where the design team submit the building information model (BIM) from the IMPACT compliant software tool (or equivalent) for the assessed building to BRE Global (via the project's appointed BREEAM Assessor). See compliance note CN17.		
Mat 02: Hard Landscaping and Boundary Protection						
	Mat 02-01	**1**	**0**	1. Where at least 80% of all external hard landscaping and 80% of all boundary protection (by area) in the construction zone achieves an A or A+ rating, as defined in the Green Guide to Specification. Green Guide ratings for the specification(s) of each element can be found at www.thegreenguide.org.uk		This credit usually requires recycled sub-bases for hard landscaping. It could be targeted, if required.

Mat 03: Responsible Sourcing of Materials						
	Mat 03-Pre	**0**	**0**	1. All timber and timber based products used on the project is ' Legally harvested and traded timber ' (see Relevant definitions).		It is a mandatory requirement for all BREEAM levels that all timber and timber based products are 'legally harvested and traded timber'. It is thought that at least 2 of the 3 responsible sourcing credits will be awarded, and that a compliant sustainable procurement plan will be implemented.
	Mat 03-01	**1**	**1**	2. The principal contractor sources materials for the project in accordance with a documented sustainable procurement plan (see the Relevant definitions in the Additional information section).		
	Mat 03-02	**3**	**2**	3. The available RSM credits (refer to Table - 1) can be awarded where the applicable building materials (refer to Table - 2) are responsibly sourced in accordance with the BREEAM methodology, as defined in steps 1 to 2 in the Methodology section below.		
Exemplary Performance Criteria	Mat 03-Ex	**1**	**0**	4. Where at least 70% of the available RSM points are achieved.		
Mat 04: Insulation						
	Mat 04-01	**1**	**1**	1. Any new insulation specified for use within the following building elements must be assessed: a. External walls b. Ground floor c. Roof d. Building services.		It is assumed that this credit will be targeted.
				The Insulation Index for the building fabric and services insulation is the same as or greater than 2.5. See the Methodology section for a description of calculating the Insulation Index.		
Mat 05: Designing for durability and resilience						
	Mat 05-01	**1**	**1**	1. The building incorporates suitable durability and protection measures or designed features/solutions to prevent damage to vulnerable parts of the internal and external building and landscaping elements. This must include, but is not necessarily limited to: a. Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors etc.). b. Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas. c. Protection against, or prevention from, any potential vehicular collision where vehicular parking and manoeuvring occurs within 1m of the external building façade for all car parking areas and within 2m for all delivery areas.		It is assumed that this credit will be targeted.
				2. The relevant building elements incorporate appropriate design and specification measures to limit material degradation due to environmental factors. (See Methodology for the process to assess this criterion).		
Mat 06: Material efficiency						
	Mat 06-01	**1**	**1**	1. Opportunities have been identified, and appropriate measures investigated and implemented, to optimise the use of materials in building design, procurement, construction, maintenance and end of life	1 to 5	It is assumed that this credit will be targeted.
				2. The above is carried out by the design/construction team in consultation with the relevant parties (see CN3) at each of the following RIBA stages: a. Preparation and Brief b. Concept Design c. Developed Design d. Technical Design e. Construction.		

Wst 01: Construction Waste Management						
Construction resource efficiency	Wst 01-01	**3**	**2**	1. Where a Resource Management Plan (RMP) has been developed covering the non-hazardous waste related to on-site construction and dedicated off-site manufacture or fabrication (including demolition and excavation waste) generated by the building's design and construction (see CN3).		It is assumed that at least 2 credits will be targeted.
				2. Where construction waste related to on-site construction and dedicated off-site manufacture/fabrication (excluding demolition and excavation waste) meets or is lower than the following: Amount of waste generated per 100m2 One credit for ≤13.3m3 or ≤11.1 tonnes Two credits for ≤7.5m3 or ≤6.5 tonnes Three credits for ≤3.4m3 or ≤3.2 tonnes Exemplary level for ≤1.6m3 or ≤1.9 tonnes		
				3. Where existing buildings on the site will be demolished a pre-demolition audit of any existing buildings, structures or hard surfaces is completed to determine if, in the case of demolition, refurbishment/reuse is feasible and, if not, to maximise the recovery of material from demolition for subsequent high grade/value applications. The audit must be referenced in the RMP and cover: a. Identification of the key refurbishment/demolition materials. b. Potential applications and any related issues for the reuse and recycling of the key refurbishment and demolition materials in accordance with the waste hierarchy.		
Diversion of resources from landfill	Wst 01-02	**1**	**1**	4.The following percentages of non-hazardous construction (on-site and off-site manufacture/fabrication in a dedicated facility), demolition and excavation waste (where applicable) generated by the project have been diverted from landfill: One credit - 70% of non-demolition and 80% of demolition waste by volume (80% of non-demolition and 90% of demolition waste by tonnage) Exemplary level - 85% of non-demolition , 85% of demolition waste and 95% of excavation by volume (90% of non-demolition and 95% of demolition and excavation waste by tonnage)		It is assumed that this credit will be awarded.
				5. Waste materials will be sorted into separate key waste groups as per Table - 50 (according to the waste streams generated by the scope of the works) either on-site or through a licensed contractor for recovery		
Exemplary Performance Criteria	Wst 01-Ex	**1**	**0**	6. Non-hazardous construction waste generated by the building's design and on-site construction and off-site manufacture or fabrication (excluding demolition and excavation waste) is no greater than the exemplary level resource efficiency benchmark (outlined in Table - 48).		
				7. The percentage of non-hazardous construction (on-site and dedicated off-site manufacture/fabrication), demolition and excavation waste (if relevant) diverted from landfill meets or exceeds the exemplary level percentage benchmark (outlined in Table - 49).		
				8. All key waste groups are identified for diversion from landfill in the RMP.		
Wst 02: Recycled Aggregates						
	Wst 02-01	**1**	**0**	1. The percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the following minimum % levels (by weight or volume) to contribute to the total amount of recycled or secondary aggregate, as specified in.		The requirements of this credits are fairly onerous. This credit could be targeted, if required.
				2. The total amount of recycled or secondary aggregate specified, and meeting criterion 1, is greater than 25% (by weight or volume) of the total high grade aggregate specified for the development. Where the minimum level in criterion 1 is not met for an application, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified.		
				3. The recycled or secondary aggregates are EITHER: a. Construction, demolition and excavation waste obtained on-site or off-site OR b. Secondary aggregates obtained from a non-construction post-consumer industrial by product source (see Relevant definitions section).		
Exemplary Performance Criteria	Wst 02-Ex	**1**	**0**	The following outlines the exemplary level criteria to achieve an innovation credit for this BREEAM issue. 4. The percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the exemplary minimum levels (by weight or volume), as defined in the table above. Where this minimum level is not met, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified.		
				5. Where the total amount of recycled or secondary aggregate specified is greater than 35% (by weight or volume) of the total high grade aggregate specified for the project. Where the minimum level in criterion 1 is not met for an application, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified.		
				6. The contributing secondary aggregate must not be transported more than 30 km by road transport.		

				Wst 03: Operational Waste		
	Wst 03-01	**1**	**1**	1. Dedicated space(s) is provided for the segregation and storage of operational recyclable waste volumes generated by the assessed building/unit, its occupant(s) and activities. This space must be: a. Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams b. Accessible to building occupants or facilities operators for the deposit of materials and collections by waste management contractors c. Of a capacity appropriate to the building type, size, number of units (if relevant) and predicted volumes of waste that will arise from daily/weekly operational activities and occupancy rates.		It is assumed that this credit will be targeted.
				2. Where the consistent generation in volume of the appropriate operational waste streams is likely to exist, e.g. large amounts of packaging or compostable waste generated by the building's use and operation, the following facilities are provided: a. Static waste compactor(s) or baler(s); situated in a service area or dedicated waste management space. b. Vessel(s) for composting suitable organic waste resulting from the building's daily operation and use; OR adequate space(s) for storing segregated food waste and compostable organic material prior to collection and delivery to an alternative composting facility. c. Where organic waste is to be stored/composted on-site, a water outlet is provided adjacent to or within the facility for cleaning and hygiene purposes.		
				Wst 05: Adaptation to climate change		
	Wst 05-01	**1**	**1**	1. Conduct a climate change adaptation strategy appraisal for structural and fabric resilience by the end of Concept Design (RIBA Stage 2 or equivalent), in accordance with the following approach: a. Carry out a systematic (structural and fabric resilience specific) risk assessment to identify and evaluate the impact on the building over its projected life cycle from expected extreme weather conditions arising from climate change and, where feasible, mitigate against these impacts. The assessment should cover the following stages: i. Hazard identification ii. Hazard assessment iii. Risk estimation iv. Risk evaluation v. Risk management.	2	It is assumed that this credit will be targeted.
	Wst 05-Ex	**1**	**0**	A holistic approach to the design and construction of the current building's life cycle, to mitigate against the impacts of climate change, is represented by the achievement of these criteria. The following outlines the exemplary level criteria to achieve an innovation credit for this BREEAM issue: 2.Achievement of the Structural and fabric resilience criterion in this issue and the following criteria points or credits: Hea 04 Thermal comfort (Link to Wst 05 issue:- to preventing increasing risks of overheating) Criterion 6 in the second credit of the Hea 04 issue has been achieved. Ene 01 Reduction of energy use and carbon emissions (Link to Wst 05 issue: to maximise energy efficiency contributing to low carbon emissions resulting from increasing energy demands) At least eight credits in this issue have been achieved.		The requirements of this credits are fairly onerous. This credit could be targeted, if required.
				Wst 06: Functional adaptability		
	Wst 06-01	**1**	**1**	1. A building-specific functional adaptation strategy study has been undertaken by the client and design team by Concept Design (RIBA Stage 2 or equivalent), which includes recommendations for measures to be incorporated to facilitate future adaptation.	2	This credit requires a functional adaptation strategy to be undertaken by RIBA Stage 2.
				2. Functional adaptation measures have been implemented (RIBA Stage 4 or equivalent) in accordance with the functional adaptation strategy recommendations, where practical and cost effective. Omissions have been justified in writing to the assessor.	4	

<table>
<tr><th colspan="7">LE 01: Site Selection</th></tr>
<tr><td>Previously Developed Land</td><td>LE 01-01</td><td>1</td><td>0</td><td>1. At least 75% of the proposed development's footprint is on an area of land which has previously been occupied by industrial, commercial or domestic buildings or fixed surface infrastructure.</td><td></td><td>The proposed site is greenfield. As such it is unlikely that this credit will be awarded.</td></tr>
<tr><td rowspan="2">Contaminated Land</td><td rowspan="2">LE 01-02</td><td rowspan="2">1</td><td rowspan="2">0</td><td>2. A contaminated land specialist's site investigation, risk assessment and appraisal has deemed land within the site to be affected by contamination. The site investigation, risk assessment and appraisal have identified:

a. The degree of contamination
b. The contaminant sources/types
c. The options for remediating sources of contamination which present an unacceptable risk.</td><td rowspan="2"></td><td rowspan="2">It is unlikely that the site will be considered to be significantly contaminated.</td></tr>
<tr><td>3. The client or principal contractor confirms that remediation of the site will be carried out in accordance with the remediation strategy and its implementation plan as recommended by the contaminated land specialist.</td></tr>
<tr><th colspan="7">LE 02: Ecological Value of Site and Protection of Ecological Features</th></tr>
<tr><td>Ecological value of site</td><td>LE 02-01</td><td>1</td><td>0</td><td>1. Land within the construction zone is defined as 'land of low ecological value' using either:

a. The BREEAM checklist for defining land of low ecological value (see Checklists and tables below);
OR
b. A Suitably Qualified Ecologist (SQE) who has identified the land as being of 'low ecological value' within an ecological assessment report, based on a site survey.</td><td rowspan="3"></td><td rowspan="3">A number of ecological features are to be removed. These credits will therefore be withheld.</td></tr>
<tr><td rowspan="2">Protection of ecological features</td><td rowspan="2">LE 02-02</td><td rowspan="2">1</td><td rowspan="2">0</td><td>2. All existing features of ecological value within and surrounding the construction zone and site boundary area are adequately protected from damage during clearance, site preparation and construction activities in line with BS42020: 2013.</td></tr>
<tr><td>3. In all cases, the principal contractor is required to construct ecological protection recommended by the SQE, prior to any preliminary site construction or preparation works (e.g. clearing of the site or erection of temporary site facilities).</td></tr>
<tr><th colspan="7">LE 03: Mitigating Ecological Impact</th></tr>
<tr><td rowspan="2"></td><td rowspan="2">LE 03-01</td><td rowspan="2">2</td><td rowspan="2">1</td><td>Two credits where:

1.The change in ecological value of the site is equal to or greater than zero plant species, i.e. no negative change, using the methods outlined in either (a) or (b) below:

a. Determine the following information and input this data in to the BREEAM LE 03/LE 04 calculator:

i. The broad habitat type(s) that define the landscape of the assessed site in its existing pre-developed state and proposed state (see Table - 53).
ii. Area (m2) of the existing and proposed broad habitat types.

OR

b. Where a Suitably Qualified Ecologist (SQE) has been appointed and, based on their site survey, they confirm the following and either the assessor or ecologist inputs this data in to the BREEAM LE 03/LE 04 calculator:

i. The broad habitat types that define the landscape of the assessed site in its existing pre-developed state and proposed state.
ii. Area (m2) of the existing and proposed broad habitat plot types.
iii. Average total taxon (plant species) richness within each habitat type.</td><td></td><td rowspan="2">1 credit is mandatory for BREEAM 'Excellent'. It is likely that a green roof could be required.</td></tr>
<tr><td>One credit where:

2. Where the change in ecological value of the site is less than zero but equal to or greater than minus nine plant species i.e. a minimal change, use the methods outlined in either 1(a) or (b) above.</td><td></td></tr>
</table>

LE 04: Enhancing Site Ecology						
Ecologist's report and recommendations	LE 04-01	**1**	**1**	1. A suitably qualified ecologist (SQE) has been appointed by the client or their project representative by the end of the Preparation and Brief stage (RIBA Stage 1 or equivalent) to advise on enhancing the ecology of the site at an early stage.	1	It is assumed that the ecologist's recommendations will be implemented and that, therefore, the first credit will be awarded.
				2. The SQE has provided an Ecology Report with appropriate recommendations for the enhancement of the site's ecology at Concept Design stage (RIBA Stage 2 or equivalent). The report is based on a site visit/survey by the SQE (see also CN4).	2	
				3. The early stage advice and recommendations of the Ecology Report for the enhancement of site ecology have been, or will be, implemented in the final design and build.		
	LE 04-02	**1**	**0**	4. The criteria of the first credit are met.		
				5. The recommendations of the Ecology Report for the enhancement of site ecology have been implemented in the final design and build, and the SQE confirms that this will result in an increase in ecological value of the site, with an increase of six plant species or greater (refer also to Compliance note CN8 for alternative means of compliance).		
				6. The increase in plant species has been calculated using the BREEAM LE 03/LE 04 calculator, using actual plant species numbers.		
LE 05:Long Term Impact on Biodiversity						
	LE 05-01	**2**	**2**	1. Where a Suitably Qualified Ecologist (SQE) is appointed prior to commencement of activities on-site and they confirm that all relevant UK and EU legislation relating to the protection and enhancement of ecology has been complied with during the design and construction process.		It is assumed that both credits will be targeted.
				2. Where a landscape and habitat management plan, appropriate to the site, is produced covering at least the first five years after project completion in accordance with BS 42020:2013 Section 11.1. This is to be handed over to the building owner/occupants for use by the grounds maintenance staff.		
				3. Where additional measures to improve the assessed site's long term biodiversity are adopted, according to Table - 55.		
Pol 01: Impact of Refrigerants						
Impact of refrigerant	Pol 01-01	**2**	**0**	Three credits - No refrigerant use 1. Where the building does not require the use of refrigerants within its installed plant/systems.		At this early stage it is assumed that the refrigerants will not comply, however this requires confirmation from the design team and credits may still be available.
				OR alternatively, where the building does require the use of refrigerants, the three credits can be awarded as follows: Pre-requisite 2. All systems (with electric compressors) must comply with the requirements of BS EN 378:2008 (parts 2 and 3) and where refrigeration systems containing ammonia are installed, the Institute of Refrigeration Ammonia Refrigeration Systems Code of Practice		
				Two credits - Impact of refrigerant 3. Where the systems using refrigerants have Direct Effect Life Cycle CO2 equivalent emissions (DELC CO2e) of ≤ 100 kgCO2e/kW cooling/heating capacity. To calculate the DELC CO2e please refer to the Relevant definitions in the Additional information section and the Methodology section. OR		
				4. Where air-conditioning or refrigeration systems are installed the refrigerants used have a Global Warming Potential (GWP) ≤10.		
				OR One credit - Impact of refrigerant 5. Where the systems using refrigerants have Direct Effect Life Cycle CO2equivalent emissions (DELC CO2e) of ≤ 1000 kgCO 2e/kW cooling/heating capacity.		
Leak detection	Pol 01-02	**1**	**1**	6. Where systems using refrigerants have a permanent automated refrigerant leak detection system installed; OR where an in-built automated diagnostic procedure for detecting leakage is installed. In all instances a robust and tested refrigerant leak detection system must be installed and must be capable of continuously monitoring for leaks.		It is assumed that a BREEAM compliant refrigerant leak detection system will be provided to secure 1 credit. Evidence still required: - Specification - Manufacturer's literature
				7. The system must be capable of automatically isolating and containing the remaining refrigerant(s) change in response to a leak detection incident.		
Pol 02: NOx Emissions						
	Pol 02-01	**3**	**2**	1. Where the plant installed to meet the building's delivered heating and cooling demand has, under normal operating conditions, a dry NOx emission level (measured at 0% excess O2) as follows: <100mg/kWh (space heating and hot water) - 1 credit <70mg/kWh (space heating and hot water) - 2 credits <40mg/kWh (space heating and hot water) - 3 credits		It is assumed that at least 2 of the 3 available credits will be targeted.

Pol 03: Surface Water Run-off						
Flood resilience	Pol 03-01	**2**	**2**	Two credits - Low flood risk 1. Where a site-specific flood risk assessment (FRA) confirms the development is situated in a flood zone that is defined as having a low annual probability of flooding (in accordance with current best practice national planning guidance). The FRA must take all current and future sources of flooding into consideration (see CN5).		The EA flood risk map suggests that the site is in a low flood risk area. A site specific FRA will be required to confirm that there is no risk of flooding from all sources.
				One credit - Medium/high flood risk 2. Where a site-specific FRA confirms the development is situated in a flood zone that is defined as having a medium or high annual probability of flooding and is not in a functional floodplain (in accordance with current best practice national planning guidance). The FRA must take all current and future sources of flooding into consideration (see CN5).		
				3. To increase the resilience and resistance of the development to flooding, one of the following must be achieved: a. The ground level of the building and access to both the building and the site, are designed (or zoned) so they are at least 600mm above the design flood level of the flood zone in which the assessed development is located (see CN8); OR c. The final design of the building and the wider site reflects the recommendations made by an appropriate consultant in accordance with the hierarchy approach outlined in section 5 of BS 8533:2011		
Surface Water Run-off	Pol 03-02	**1**	**0**	Pre-requisite 4. An Appropriate Consultant is appointed to carry out, demonstrate and/or confirm the development's compliance with the following criteria:		As the pre-development site is largely greenfield, it is thought that this credit will not be targeted.
				One credit 5. Where drainage measures are specified to ensure that the peak rate of run-off from the site to the watercourses (natural or municipal) is no greater for the developed site than it was for the pre-development site. This should comply at the 1-year and 100-year return period events.		
				6. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place.		
				7. Calculations include an allowance for climate change; this should be made in accordance with current best practice planning guidance (see definitions).		
	Pol 03-03	**1**	**0**	One credit 8. Where flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance); AND		As the pre-development site is largely greenfield, it is thought that this credit will not be targeted.
				EITHER 9. Drainage design measures are specified to ensure that the post development run-off volume, over the development lifetime, is no greater than it would have been prior to the assessed site's development for the 100-year 6-hour event, including an allowance for climate change (see criterion 14).		
				10. Any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other Sustainable Drainage System (SuDS) techniques.		
				OR (only where criteria 9 and 10 for this credit cannot be achieved): 11. Justification from the Appropriate Consultant indicating why the above criteria cannot be achieved, i.e. where infiltration or other SuDS techniques are not technically viable options.		
				12. Drainage design measures are specified to ensure that the post development peak rate of run-off is reduced to the limiting discharge. The limiting discharge is defined as the highest flow rate from the following options: a. The pre-development 1-year peak flow rate; OR b. The mean annual flow rate Qbar; OR c. 2L/s/ha.		
				13. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place.		
				14. For either option, above calculations must include an allowance for climate change; this should be made in accordance with current best practice planning guidance.		

Minimising Water Course Pollution	Pol 03-04	**1**	**0**	15. There is no discharge from the developed site for rainfall up to 5mm (confirmed by the Appropriate Consultant).		It is thought that criteria 15 will be difficult to achieve.
				16. In areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques.		
				17. Where there is a high risk of contamination or spillage of substances such as petrol and oil (see Compliance notes for a list of areas), separators (or an equivalent system) are installed in surface water drainage systems.		
				18. Where the building has chemical/liquid gas storage areas, a means of containment is fitted to the site drainage system (i.e. shut-off valves) to prevent the escape of chemicals to natural watercourses (in the event of a spillage or bunding failure).		
				19. All water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as Pollution Prevention Guideline 3 (PPG 3) and/or where applicable the SUDS manual. For areas where vehicle washing will be taking place, pollution prevention systems must be in accordance with Pollution Prevention Guidelines 13		
				20. A comprehensive and up-to date drainage plan of the site will be made available for the building/site occupiers.		
				21. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place.		
				22. Where present, all external storage and delivery areas designed and detailed in accordance with the current best practice planning guidance (see Other information for further information).		
Pol 04: Reduction of Night Time Light Pollution						
	Pol 04-01	**1**	**1**	1. Where external lighting pollution has been eliminated through effective design that removes the need for external lighting without adversely affecting the safety and security of the site and its users. OR alternatively, where the building does have external lighting, one credit can be awarded as follows:		It is assumed that both credits will be targeted.
				2. The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the ILP Guidance notes for the reduction of obtrusive light, 2011. Buildings located in Scotland must comply with the light pollution criteria in the guidance note 'Controlling Light Pollution and Reducing Lighting Energy Consumption'. This can be demonstrated via completion of the checklists in Annexes B and C of the guidance note by a relevant member of the design team.		
				3. All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00.		
				4. If safety or security lighting is provided and will be used between 23:00 and 07:00, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILP's Guidance notes.		
				5. Illuminated advertisements, where specified, must be designed in compliance with ILE Technical Report 5 – The Brightness of Illuminated Advertisements		
Pol 05: Reduction of noise pollution						
	Pol 05-01	**1**	**1**	1. Where there are, or will be, no noise-sensitive areas or buildings within 800m radius of the assessed development. OR		It is assumed that both credits will be targeted.
				2. Alternatively, where the building does have noise-sensitive areas or buildings within 800m radius of the development, one credit can be awarded as follows: a. Where a noise impact assessment in compliance with BS 7445 has been carried out and the following noise levels measured/determined: i. Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development or at a location where background conditions can be argued to be similar. ii. The rating noise level resulting from the new noise source (see CN4).		
				3. The noise impact assessment must be carried out by a suitably qualified acoustic consultant holding a recognised acoustic qualification and membership of an appropriate professional body (see Relevant definitions in the Additional information section).		
				4. The noise level from the proposed site/building, as measured in the locality of the nearest or most exposed noise-sensitive development, is a difference no greater than +5dB during the day (07:00 to 23:00) and +3dB at night (23:00 to 07:00) compared to the background noise level.		
				5. Where the noise source(s) from the proposed site/building is greater than the levels described in criterion 4, measures have been installed to attenuate the noise at its source to a level where it will comply with criterion 4.		

Appendix 5 – Drainage and Flood Risk Report

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

GeoReports

Spencer Smith
DHA Planning
Eclipse House
Eclipse Park
Maidstone
Kent
ME14 3EN

Infiltration SuDS GeoReport:

This report provides information on the suitability of the subsurface for the installation of infiltration sustainable drainage systems (SuDS). It provides information on the properties of the subsurface with respect to significant constraints, drainage, ground stability and groundwater quality protection.

Report Id: ***GR_213623/1***

Client reference: PO-4706

Search location

Point centred at:
631098,144207

Search location indicated in red

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Scale: 1:5 000 (1cm = 50 m)

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OS Street View: Scale: 1:5 000 (1cm = 50 m)

Assessment for an infiltration sustainable drainage system

Introduction

Sustainable drainage systems (SuDS) are drainage solutions that manage the volume and quality of surface water close to where it falls as rain. They aim to reduce flow rates to rivers, increase local water storage capacity and reduce the transport of pollutants to the water environment. There are four main types of SuDS, which are often designed to be used in sequence. They comprise:

- **source control:** systems that control the rate of runoff
- **pre-treatment:** systems that remove sediments and pollutants
- **retention:** systems that delay the discharge of water by providing surface storage
- **infiltration:** systems that mimic natural recharge to the ground.

This report focuses on infiltration SuDS. It provides subsurface information on the properties of the ground with respect to drainage, ground stability and groundwater quality protection. It is intended principally for those involved in the preliminary assessment of the suitability of the ground for infiltration SuDS, and those involved in assessing proposals from others for sustainable drainage, but it may also be useful to help house-holders judge whether or not further professional advice should be sought. If in doubt, users should consult a suitably-qualified professional about the results in this report before making any decisions based upon it.

This GeoReport is structured in two parts:

- **Part 1. Summary data**.

  Comprises three maps that summarise the data contained within Part 2.

- **Part 2. Detailed data**.

  Comprises a further 24 maps in four thematic sections:

  - **Very significant constraints.** Maps highlight areas where infiltration may result in adverse impacts due to factors including: ground instability (soluble rocks, non-coal shallow mining and landslide hazards); persistent shallow groundwater, or the presence of made ground, which may represent a ground stability or contamination hazard.
  - **Drainage potential**. Maps indicate the drainage potential of the ground, by considering subsurface permeability, depth to groundwater and the presence of floodplain deposits.
  - **Ground stability**. Maps indicate the presence of hazards that have the potential to cause ground instability resulting in damage to some buildings and structures, if water is infiltrated to the ground.
  - **Groundwater protection**. Maps provide key indicators to help determine whether the groundwater may be susceptible to deterioration in quality as a result of infiltration.

This report considers the suitability of the subsurface for the installation of infiltration SuDS, such as soakaways, infiltration basins or permeable pavements. It provides subsurface data to indicate whether, and which type of infiltration system may be appropriate. It does not state that infiltration SuDS are, or are not, appropriate as this is highly dependent on the design of the individual system. This report therefore describes the subsurface conditions at the site, allowing the reader to determine the suitability of the site for infiltration SuDS.

The map and text data in this report is similar to that provided in the '*Infiltration SuDS Map: Detailed'* national map product. For further information about the data, consult the '*User Guide for the Infiltration SuDS Map: Detailed'*, available from http://nora.nerc.ac.uk/16618/.

PART 1: SUMMARY DATA

This section provides a summary of the data on the following pages.

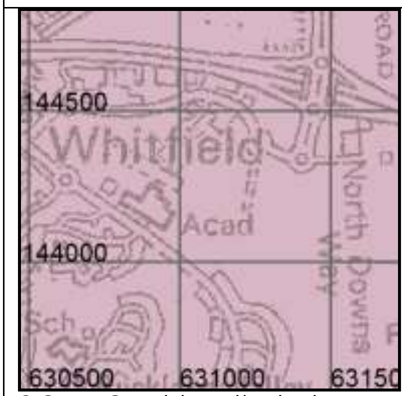
In terms of the drainage potential, is the ground suitable for infiltration SuDS?

- Highly compatible for infiltration SuDS. The subsurface is likely to be suitable for free-draining infiltration SuDS.
- Probably compatible for infiltration SuDS. The subsurface is probably suitable although the design may be influenced by the ground conditions.
- Opportunities for bespoke infiltration SuDS. The subsurface is potentially suitable although the design will be influenced by the ground conditions.
- Very significant constraints are indicated. There is a very significant potential for one or more hazards associated with infiltration.

Is ground instability likely to be a problem?

- Increased infiltration is very unlikely to result in ground instability.
- Ground instability problems may be present or anticipated, but increased infiltration is unlikely to result in ground instability
- Ground instability problems are probably present. Increased infiltration may result in ground instability.
- There is a very significant potential for one or more geohazards associated with infiltration.

Is the groundwater susceptible to deterioration in quality?



- The groundwater is not expected to be especially vulnerable to contamination.
- The groundwater may be vulnerable to contamination.
- The groundwater is likely to be vulnerable to contaminants.
- Made ground is present at the surface. Infiltration may increase the possibility of remobilising pollutants.

PART 2: DETAILED DATA

This section provides further information about the properties of the ground and will help assess the suitability of the ground for infiltration SuDS.

Section 1. Very significant constraints

Where maps are overlain by grey polygons, geological or hydrogeological hazards may exist that could be made worse by infiltration. The following hazards are considered:

- soluble rocks
- landslides
- shallow mining
- shallow groundwater
- made ground

For more information read ‘Explanation of terms’ at the end of this report.

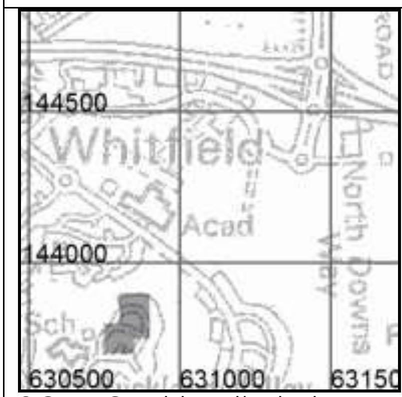
Soluble rock hazard

☐ (grey) Very significant soluble rock hazard.

Soluble rocks are present with a very significant possibility of localised subsidence that could be initiated or made worse by infiltration. The site investigation should consider whether the potential for or the consequences of subsidence as a result of infiltration are significant.

☐ Very significant soluble rock hazards are not present; however this hazard may still need to be considered. See Part 3.

Landslide hazard

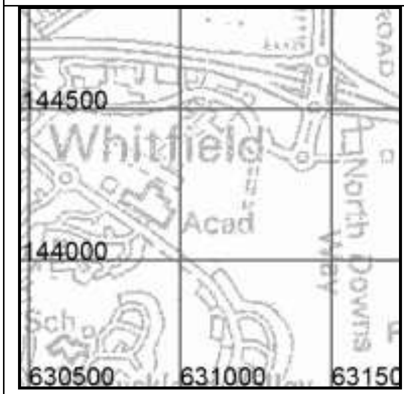


☐ (grey) Very significant landslide hazard.

Slope instability problems are almost certainly present and may be active. An increase in moisture content as a result of infiltration may cause the slope to fail. The site investigation should consider whether the potential for or the consequences of landslide as a result of infiltration are significant.

☐ Very significant landslide hazards are not present; however this hazard may still need to be considered. See Part 3.

Shallow mining hazard



- [x] Very significant mining hazard.

Shallow mining is likely to be present with a very significant possibility of localised subsidence that could be initiated or made worse by increased infiltration. Also, infiltration may increase the possibility of remobilising pollutants. The site investigation should consider whether the potential for or consequences of subsidence and/or remobilisation of pollutants as a result of infiltration are significant.

- [ ] Very significant mining hazards are not present; however this hazard may still need to be considered. See Part 3.

Persistent shallow groundwater

- [x] Very high likelihood of persistent or seasonally shallow groundwater.

Persistent or seasonally shallow groundwater is likely to be present. Infiltration may increase the likelihood of soakaway inundation, or groundwater emergence at the surface. The site investigation should consider whether the potential for or the consequences of groundwater level rise as a result of infiltration are significant.

- [ ] See Part 2 for the likely depth to water table.

Made ground

- [x] Made ground present.

Made ground is present at the surface. Infiltration may affect ground stability or increase the possibility of remobilising pollutants. The site investigation should consider whether the potential for or consequences of ground instability and/or pollutant leaching as a result of infiltration are significant.

- [ ] None recorded

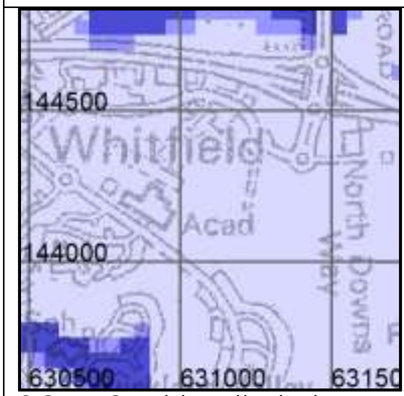
Section 2. Drainage potential

The following pages contain maps that will help you assess the drainage potential of the ground by considering the:

- depth to water table
- permeability of the superficial deposits
- thickness of the superficial deposits
- permeability of the bedrock
- presence of floodplains

Superficial deposits are not present everywhere and therefore some areas of the *superficial deposit permeability* map may not be coloured. Where this is the case, the *bedrock permeability* map shows the likely permeability of the ground. Superficial deposits in some places are very thin and hence in these places you may wish to consider both the permeability of the superficial deposits and the permeability of the bedrock. The *superficial thickness* map will tell you whether the superficial deposits are thin (< 3 m thick) or thick (>3 m). Where they are over 3 m thick, the permeability of the bedrock may not be relevant.
For more information read ‘Explanation of terms’ at the end of this report.

Depth to groundwater table



Groundwater is likely to be **more than 5 m** below the ground surface throughout the year.

Groundwater is likely to be between **3 and 5 m** below the ground surface for at least part of the year.

Groundwater is likely to be **less than 3 m** below the ground surface for at least part of the year.

Superficial deposit permeability

Superficial deposits are likely to be **free-draining**.

The superficial deposit permeability is **spatially variable**, but likely to permit moderate infiltration.

Superficial deposits are likely to be **poorly draining**.

These maps show the permeability range that is summarised above.

- Very Low
- Low
- Moderate
- High
- Very High

Minimum

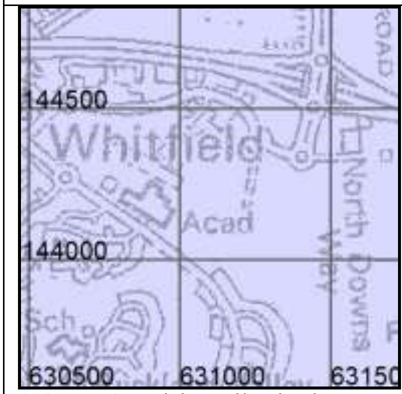
Maximum

Superficial deposit thickness

The thickness of superficial deposits is **< 3 m** and hence the permeability of the ground may be dependent on both the superficial deposits (where present) and underlying bedrock (see below).

The thickness of superficial deposits is **> 3 m** and hence the permeability of the superficial deposits is likely to determine the permeability of the ground.

Bedrock permeability



Bedrock deposits are likely to be **free-draining**.

The bedrock permeability is **spatially variable**, but likely to permit moderate infiltration.

Bedrock deposits are likely to be **poorly draining**.

These maps show the permeability range that is summarised above.

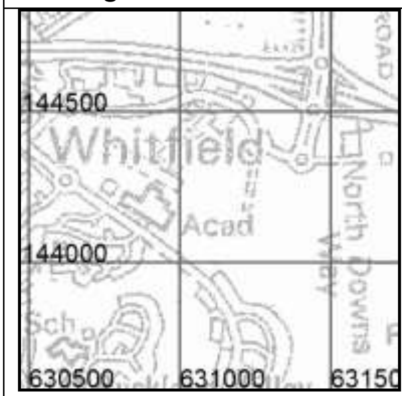
Key

- Very Low
- Low
- Moderate
- High
- Very High

Minimum

Maximum

Geological indicators of flooding



Superficial floodplain deposits or low-lying coastal areas have been identified. Groundwater levels may rise in response to high river or tide levels, potentially causing inundation of subsurface infiltration SuDS.

Section 3. Ground stability

The following pages contain maps that will help you assess whether infiltration may impact the stability of the ground. They consider hazards associated with:

- soluble rocks
- landslides
- shallow mining
- running sands
- swelling clays
- compressible ground, and
- collapsible ground

In the following maps, geohazards that are identified in green are unlikely to prevent infiltration SuDS from being installed, but they should be considered during design. For more information read ‘Explanation of terms’ at the end of this report.

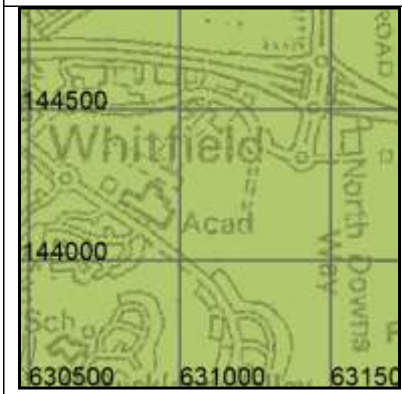
Soluble rocks

	Increased infiltration is unlikely to result in subsidence.
	Increased infiltration is unlikely to cause localised subsidence, but potential impacts should be considered.
	Increased infiltration may result in localised subsidence. The potential for or the consequences of subsidence associated with soluble rocks should be considered.
	Very significant possibility of localised subsidence that could be initiated or made worse by infiltration.

Landslides

- Increased infiltration is unlikely to lead to slope instability.
- Slope instability problems may be present or anticipated, but increased infiltration is unlikely to cause instability
- Slope instability problems are probably present or have occurred in the past, and increased infiltration may result in slope instability.
- Slope instability problems are almost certainly present and may be active. An increase in moisture content as a result of infiltration may cause the slope to fail.

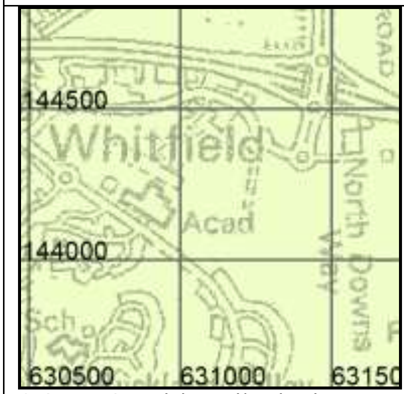
Shallow mining



- Increased infiltration is unlikely to lead to subsidence.
- Shallow mining is possibly present. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
- Shallow mining could be present with a significant possibility that localised subsidence could be initiated or made worse by increased infiltration.
- Shallow mining is likely to be present, with a very significant possibility that localised subsidence may be initiated or made worse by increased infiltration.

Running sand

- Increased infiltration is unlikely to cause ground collapse associated with running sands.
- Running sand is possibly present. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
- Significant possibility for running sand problems. Increased infiltration may result in a geohazard.

Swelling clays	
 © Crown Copyright and/or database right 2016. All rights reserved. Licence number 100021290 EUL	Increased infiltration is unlikely to cause shrink-swell ground movement. Ground is susceptible to shrink-swell ground movement. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered. Ground is susceptible to shrink-swell ground movement. Increased infiltration may result in a geohazard.
Compressible ground	
 © Crown Copyright and/or database right 2016. All rights reserved. Licence number 100021290 EUL	Increased infiltration is unlikely to lead to ground compression. Compressibility and uneven settlement hazards are probably present. Increased infiltration may result in a geohazard.
Collapsible ground	
 © Crown Copyright and/or database right 2016. All rights reserved. **Licence number 100021290 EUL**	Increased infiltration is unlikely to result in subsidence. Deposits with potential to collapse when loaded and saturated are possibly present in places. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered. Deposits with potential to collapse when loaded and saturated are probably present in places. Increased infiltration may result in a geohazard.

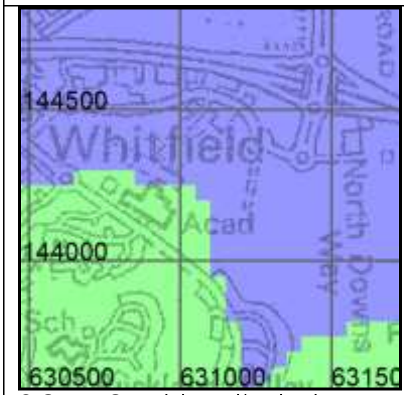
Section 4. Groundwater quality protection

The following pages contain maps showing some of the information required to ensure the protection of groundwater quality. Data presented includes:

- groundwater source protection zones (Environment Agency data)
- predominant flow mechanism
- made ground

For more information read ‘Explanation of terms’ at the end of this report.

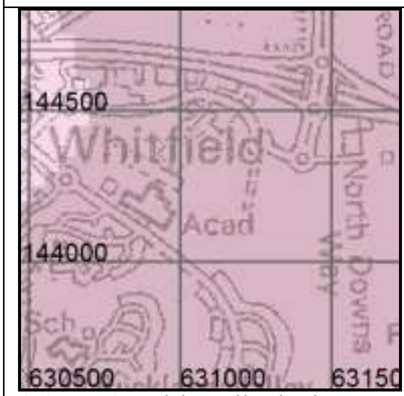
Groundwater source protection zones



Derived in part from Source Protection Zone data provided under licence from the Environment Agency © Environment Agency 2016.

- Groundwater is not within a source protection zone.
- Source protection zone IV
- Source protection zone III
- Source protection zone II
- Source protection zone I.

Predominant flow mechanism



- Water is likely to percolate through the unsaturated zone to the groundwater through either the pore space in granular media or through porespace and fractures; these processes have some potential for contaminant removal and breakdown.
- Water is likely to percolate through the unsaturated zone to the groundwater through fractures, a process which has little potential for contaminant removal and breakdown.

Made ground	
 **Licence number 100021290 EUL**	Made ground is present at the surface. Infiltration may increase the possibility of remobilising pollutants.

Section 5. Geological Maps

The following maps show the artificial, superficial and bedrock geology within the area of interest.

Artificial deposits

Superficial deposits

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Bedrock

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Fault

Coal, ironstone or mineral vein

Note: Faults and Coals, ironstone & mineral veins are shown for illustration and to aid interpretation of the map. Not all such features are shown and their absence on the map face does not necessarily mean that none are present

Key to Artificial deposits:
No deposits recorded by BGS in the search area

Key to Superficial deposits:

Map colour	Computer Code	Rock name	Rock type
	HEAD-XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
	HEAD-XZV	HEAD	SILT AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
	CWF-XCZSV	CLAY-WITH-FLINTS FORMATION	CLAY, SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]

Key to Bedrock geology:

Map colour	Computer Code	Rock name	Rock type
	MACK-CHLK	MARGATE CHALK MEMBER	CHALK
	SECK-CHLK	SEAFORD CHALK FORMATION	CHALK
	LECH-CHLK	LEWES NODULAR CHALK FORMATION	CHALK

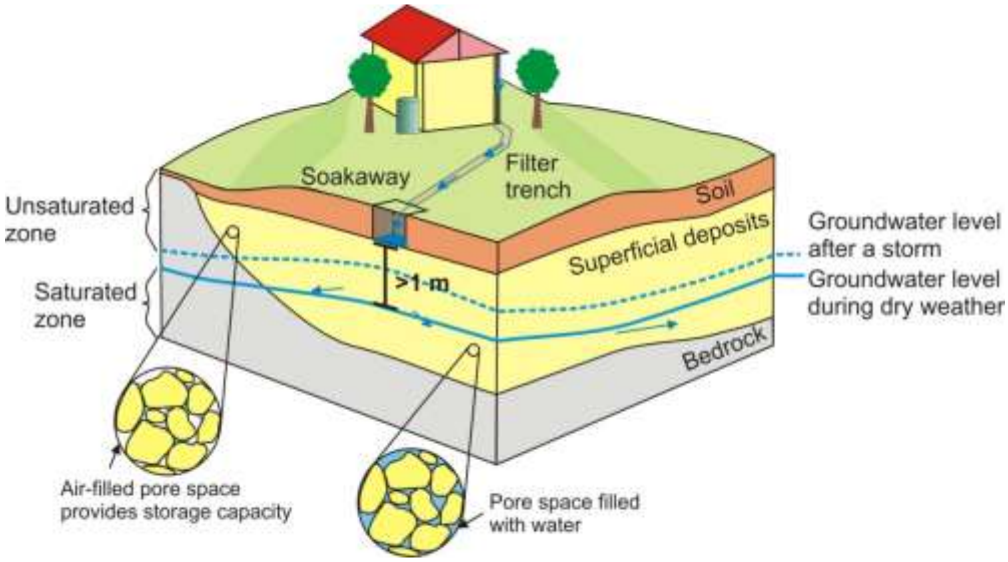
Limitations of this report:

- This report is concerned with the potential for infiltration-to-the-ground to be used as a SuDS technique at the site described. It only considers the subsurface beneath the search area and does NOT consider potential surface or subsurface impacts outside of that area.
- This report is NOT an alternative for an on-site investigation or soakaway test, which might reach a different conclusion.
- This report must NOT be used to justify disposal of foul waste or grey water.
- This report is based on and limited to an interpretation of the records held by the British Geological Survey (BGS) at the time the search is performed. The datasets used (with the exception of that showing depth to water table) are based on 1:50 000 digital geological maps and not site-specific data.
- Other more specific and detailed ground instability information for the site may be held by BGS, and an assessment of this could result in a modified assessment.
- To interpret the maps correctly, the report must be viewed and printed in colour.
- The search does NOT consider the suitability of sites with regard to:
    - previous land use,
    - potential for, or presence of contaminated land
    - presence of perched water tables
    - shallow mining hazards relating to coal mining. Searches of coal mining should be carried out via The Coal Authority Mine Reports Service: www.coalminingreports.co.uk.
    - made ground, where not recorded
    - proximity to landfill sites (searches for landfill sites or contaminated land should be carried out through consultation with local authorities/Environment Agency)
    - zones around private water supply boreholes that are susceptible to groundwater contamination.
- This report is supplied in accordance with the GeoReports Terms & Conditions available separately, and the copyright restrictions described at the end of this report

Explanation of terms

Depth to groundwater

In the shallow subsurface, the ground is commonly unsaturated with respect to water. Air fills the spaces within the soil and the underlying superficial deposits and bedrock. At some depth below the ground surface, there is a level below which these spaces are full of water. This level is known as the groundwater level, and the water below it is termed the groundwater. When water is infiltrated, the groundwater level may rise temporarily. To ensure that there is space in the unsaturated zone to accommodate this, there should be a minimum thickness of 1 m between the base of the infiltration system and the water table. An estimate of the *depth to groundwater* is therefore useful in determining whether the ground is suitable for infiltration.



Groundwater flooding

Groundwater flooding occurs when a rise in groundwater level results in very shallow groundwater or the emergence of groundwater at the surface. If infiltration systems are installed in areas that are susceptible to groundwater flooding, it is possible that the system could become inundated. The susceptibility map seeks to identify areas where the geological conditions and water tables indicate that groundwater level rise could occur under certain circumstances. A high susceptibility to groundwater flooding classification does not mean that groundwater flooding has ever occurred in the past, or will do so in the future as the susceptibility maps do not contain information on how often flooding may occur. The susceptibility maps are designed for planning; identifying areas where groundwater flooding might be an issue that needs to be taken into account.

Geological indicators of flooding

In floodplain deposits, groundwater level can be influenced by the water level in the adjacent river. Groundwater level may increase during periods of fluvial flood and therefore this should be taken into account when designing infiltration systems on such deposits. The *geological indicators of flooding* dataset shows where there is geological evidence (floodplain deposits) that flooding has occurred in the past.

For further information on flood-risk, the likely frequency of its recurrence in relation to any proposed development of the site, and the status of any flood prevention measures in place, you are advised to contact the local office of the Environment Agency (England and Wales) at www.environment-agency.gov.uk/ or the Scottish Environment Protection Agency (Scotland) at www.sepa.org.uk.

Artificial ground

Artificial ground comprises deposits and excavations that have been created or modified by human activity. It includes ground that is worked (quarries and road cuttings), infilled (back-filled quarries), landscaped (surface re-shaping), disturbed (near surface mineral workings) or classified as made ground (embankments and spoil heaps). The composition and properties of artificial ground are often unknown. In particular, the permeability and chemical composition of the artificial ground should be determined to ensure that the ground will drain and that any contaminants present will not be remobilised.

Superficial permeability

Superficial deposits are those geological deposits that were formed during the most recent period of geological time (as old as 2.6 million years before present). They generally comprise relatively thin deposits of gravel, sand, silt and clay and are present beneath the pedological soil in patches or larger spreads over much of Britain. The ease with which water can percolate through these deposits is controlled by their permeability and varies widely depending on their composition. Those deposits comprising clays and silts are less permeable and thus infiltration is likely to be slow, such that water may pool on the surface. In comparison, deposits comprising sands and gravels are more permeable allowing water to percolate freely.

Bedrock permeability

Bedrock forms the main mass of rock forming the Earth. It is present everywhere, commonly beneath superficial deposits. Where the superficial deposits are thin or absent, the ease with which water will percolate into the ground depends on the permeability of the bedrock.

Natural ground instability
Natural ground instability refers to the propensity for upward, lateral or downward movement of the ground that can be caused by a number of natural geological hazards (e.g. ground dissolution/compressible ground). Some movements associated with particular hazards may be gradual and of millimetre or centimetre scale, whilst others may be sudden and of metre or tens of metres scale. Significant natural ground instability has the potential to cause damage to buildings and structures, especially when the drainage characteristics of a site are altered. It should be noted, however, that many buildings, particularly more modern ones, are built to such a standard that they can remain unaffected in areas of significant ground movement.

Shrink-swell
A shrinking and swelling clay changes volume significantly according to how much water it contains. All clay deposits change volume as their water content varies, typically swelling in winter and shrinking in summer, but some do so to a greater extent than others. Contributory circumstances could include drought, leaking service pipes, tree roots drying-out the ground or changes to local drainage patterns, such as the creation of soakaways. Shrinkage may remove support from the foundations of buildings and structures, whereas clay expansion may lead to uplift (heave) or lateral stress on part or all of a structure; any such movements may cause cracking and distortion.

Landslides (slope stability)
A landslide is a relatively rapid outward and downward movement of a mass of ground on a slope, due to the force of gravity. A slope is under stress from gravity but will not move if its strength is greater than this stress. If the balance is altered so that the stress exceeds the strength, then movement will occur. The stability of a slope can be reduced by removing ground at the base of the slope, by placing material on the slope, especially at the top, or by increasing the water content of the materials forming the slope. Increase in subsurface water content beneath a soakaway could increase susceptibility to landslide hazards. The assessment of landslide hazard refers to the stability of the present land surface. It does not encompass a consideration of the stability of excavations.

Soluble rocks (dissolution)
Some rocks are soluble in water and can be progressively removed by the flow of water through the ground. This process tends to create cavities, potentially leading to the collapse of overlying materials and possibly subsidence at the surface. The release of water into the subsurface from infiltration systems may increase the dissolution of rock or destabilise material above or within a cavity. Dissolution cavities may create a pathway for rapid transport of contaminated water to an aquifer or water course.

Compressible ground

Many ground materials contain water-filled pores (the spaces between solid particles). Ground is compressible if a building (or other load) can cause the water in the pore space to be squeezed out, causing the ground to decrease in thickness. If ground is extremely compressible the building may sink. If the ground is not uniformly compressible, different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. The compressibility of the ground may alter as a result of changes in subsurface water content caused by the release of water from soakaways.

Collapsible deposits

Collapsible ground comprises certain fine-grained materials with large pore spaces (the spaces between solid particles). It can collapse when it becomes saturated by water and/or a building (or other structure) places too great a load on it. If the material below a building collapses it may cause the building to sink. If the collapsible ground is variable in thickness or distribution, different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. The subsurface underlying a soakaway will experience an increase in water content that may affect the stability of the ground. This hazard is most likely to be encountered only in parts of southern England.

Running sand

Running sand conditions occur when loosely-packed sand, saturated with water, flows into an excavation, borehole or other type of void. The pressure of the water filling the spaces between the sand grains reduces the contact between the grains and they are carried along by the flow. This can lead to subsidence of the surrounding ground. Running sand is potentially hazardous during the drainage system installation. During installation, excavation of the ground may create a space into which sand can flow, potentially causing subsidence of surrounding ground.

Shallow mining hazards (non coal)

Current or past underground mining for coal or for other commodities can give rise to cavities at shallow or intermediate depths, which may cause fracturing, general settlement, or the formation of crown-holes in the ground above. Spoil from mineral workings may also present a pollution hazard. The release of water into the subsurface from soakaways may destabilise material above or within a cavity. Cavities arising as a consequence of mining may also create a pathway for rapid transport of contaminated water to an aquifer or watercourse. The mining hazards map is derived from the geological map and considers the potential for subsidence associated with mining on the basis of geology type. Therefore if mining is known to occur within a certain rock, the map will highlight the potential for a hazard within the area covered by that geology.

For more information regarding underground and opencast **coal mining**, the location of mine entries (shafts and adits) and matters relating to subsidence or other ground movement induced by **coal mining** please contact the Coal Authority, Mining Reports, 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG; telephone 0845 762 6848 or at www.coal.gov.uk**.** For more information regarding other types of mining (i.e. non-coal), please contact the British Geological Survey.

Groundwater source protection zones

In England and Wales, the Environment Agency has defined areas around wells, boreholes and springs that are used for the abstraction of public drinking water as source protection zones. In conjunction with Groundwater Protection Policy the zones are used to restrict activities that may impact groundwater quality, thereby preventing pollution of underlying aquifers, such that drinking water quality is upheld. The Environment Agency can provide advice on the location and implications of source protection zones in your area (www.environment-agency.gov.uk/)

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- Note that for some sites, the latest available records may be quite historical in nature, and while every effort is made to place the analysis in a modern geological context, it is possible in some cases that the detailed geology at a site may differ from that described.

Report issued by
BGS Enquiry Service

Evans & Langford LLP

- Structural & Civil Engineers
- Project Managers
- Land & Building Surveyors
- CDM Consultants
- Geo-Environmental Engineers
- Contract Administrators

Our Ref: 13850X/HW/CPS

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23 June 2016

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By email only

For the attention of Mr Tom Pinnington

Dear Tom

Land off Honeywood Parkway, Dover

This report has been prepared to present an initial assessment of surface water drainage options for the proposed Dover Leisure Centre at Land off Honeywood Parkway in Dover. In order to complete this assessment, Environment Agency (EA) and British Geological Survey (BGS) maps were consulted along with a BGS Infiltration SuDs GeoReport, which is specific to the site and is appended to this report.

Site Location and Setting

The site is located approximately 1.1km to the south east of Whitfield, 2.7km to the north-north west of Dover and is centred on National Grid Reference 631100, 144230.

Currently the site comprises open farm land, occupying an area of around 12.5 hectares, bound to the north by Honeywood Parkway. The northern part of the site is bound to the west by commercial developments off Kedleston Road and to the east by a spur road from Honeywood Parkway. The southern part of the site is bound to the west by Dover Christ Church Academy and to the south by Melbourne Avenue. The eastern extent of this part of the site is undefined. The northern boundary is defined in part by a hedgerow.

The site lies in a fairly open area with some further commercial development to the north west and a little to the north east and with residential areas to the south and south east. Land to the north of the A2 is largely undeveloped, with the exception of Whitfield to the north west and smaller villages to the north and north east.

Evans & Langford LLP (E&L) have previously carried out a topographical survey of the north western part of the site. This shows the most northern part of the site to lie at 119.3m, with land sloping up to the south west to 126.3m over a horizontal distance of 260m. Ordnance Survey mapping of the site as a whole shows the site to slope up from the northern corner, which lies a little below the 120m OD contour, up to 125m OD at about the mid-point of the site, then down to the south western boundary which lies close to the 120m OD contour.

Southern Water asset plans show that there are no surface water sewers close to the site. There is a foul sewer with a number of spurs beneath Honeywood Parkway to the north. There is a foul pumping main from Honeywood Park Industrial Park pumping station just to the north of the site. The 225mm vitrified clay rising

Continued /

main runs just within the site, following the north western boundary. Manhole information close to the south western corner of the site shows the pipe to be 1.47m below ground level. It should be noted that as part of the topographic survey works undertaken previously, E&L commissioned a buried utilities survey specialist to attempt to trace the rising main. All efforts proved fruitless; it is non-metallic and too small to be picked up by ground penetrating radar.

Geology

Reference to the BGS records for the area indicates that the site is underlain by the Margate Chalk Member. At the most southerly extent of the site, close to Melbourne Avenue the overlying Seaford Chalk Formation is present. Superficial deposits of the Clay-with-Flints Formation are mapped across the entire site, with the exception of a very small area along the centre of the southern boundary. Made/artificial ground, other than that present as a result of disturbance caused by ploughing is not likely to be present on the site.

The Margate Chalk Member comprises marl-free smooth white chalk with little flint. The Seaford Chalk Formation consists of firm white chalk with conspicuous semi-continuous nodular and tabular flint seams. Hardgrounds and thin marls are known from the lowest beds. Some flint nodules are large to very large. The Clay-with-Flints Formation is a residual deposit formed from the dissolution, decalcification and cryoturbation of bedrock strata of the Chalk Group and Palaeogene formations. It is unbedded and heterogenous. The dominant lithology is orange-brown and red-brown sandy clay with abundant nodules and rounded pebbles of flint. Angular flints are derived from the Chalk, and rounded flints, sand and clay from Palaeogene formations. The deposit locally includes bodies of yellow fine to medium grained sand, reddish brown clayey silt, and sandy clay with beds of well-rounded flint pebbles, derived from Palaeogene formations.

The Chalk generally has an undulating upper surface, which is often characterised by the presence of solution features. These generally consist of fissures in the top of the chalk but may also take the form of pipes and cavities in otherwise intact chalk, at or about the groundwater table level. The voids are often filled with loose material that has collapsed into them or alternatively, in the case of fissures in the top of the chalk, any more competent materials may arch over the void. In this instance collapse into the void can be brought about by an increase in applied load or weakening of the overlying soil, possibly by water leaking from defective drainage. These features are particularly common at the margins of any overlying deposits.

Hydrogeology

The EA classifies the superficial deposits on the site as unproductive strata in terms of groundwater storage. Both the Margate Chalk Member and Seaford Chalk Formation are classified as principal aquifers. These are 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 base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifers.

EA records and the GeoReport show the majority of the site to lie in a Zone III, total catchment groundwater source protection zone (SPZ). The eastern part of the site lies in a Zone II, outer SPZ,. A Zone III SPZ represents the area around a source within which all groundwater recharge is presumed to be discharged at the source. A Zone II SPZ is defined by a 400-day travel time from a point below the water table. This zone has a minimum radius of 250 or 500 meters around the source, depending on the size of the abstraction. EA maps do not show any licensed groundwater abstractions within 1km of the site.

The GeoReport indicates that:

- Water is likely to percolate through the unsaturated zone to the groundwater through fractures; a process which has little potential for contaminant removal and breakdown.
- Groundwater is likely to be more than 5m below the surface throughout the year.
- The superficial deposits across the site are likely to be less than 3m thick and of spatially variable permeability. These soils have a range of very low to high permeability, but are likely to permit moderate infiltration. Bedrock deposits are likely to be free draining with very high permeability.

Groundwater flow direction beneath the site is considered likely to be towards the south/south west, based on the location of the nearest surface water feature, the topography and the location of the groundwater source protection zones.

Continued/

The Ground Stability maps in the GeoReport highlight that:

- There is considered to be a very significant soluble rock hazard across the site (i.e. the solution features referred to previously) which leads to the very significant possibility of localised subsidence, that could be initiated or made worse by infiltration.
- Slope instability problems (landslides) may be present or anticipated, but increased infiltration is unlikely to cause instability.
- Shallow mining is possibly present. Increased infiltration is unlikely to cause a geohazard but potential impacts should be considered.
- The clay soils are susceptible to shrink-swell ground movement. Increased infiltration is unlikely to cause a geohazard but potential impacts should be considered.
- Ground stability hazards associated with running sand, compressible or collapsible ground are unlikely to present a problem on this site with respect to increased infiltration to the ground.

Hydrology

The nearest surface water feature evident on maps of the area is the River Dour which lies approximately 1.50km to the south, and flows to the south east. The ground level around the river to the south/south east of the site is approximately 100m vertical lower than the site itself.

EA mapping shows that the site and all areas within a 1km radius lie outside of any areas considered at risk of flooding from rivers and the sea. Additionally, the site is not considered at risk of flooding from surface water or reservoirs. There are no geological indicators of flooding highlighted in the GeoReport on or close to the site.

EA maps do not show any licensed surface water abstractions within 1km of the site.

Nearby Records and Previous Investigations

There are no BGS borehole record scans for the site itself. There are a number of boreholes shown just to the west of the southern part of the site, but no records other than the depth and location are available on their website. The exception to this is for a borehole that dates from September 1970, located to the west of the central part of the site. This borehole was drilled to 1.80m, successively through topsoil, silty clay with occasional flint chips, and flints in a silty clay matrix, identified as Head Brickearth, and Head respectively. This borehole reminded dry.

In 2007 E&L excavated six trial pits across the northern part of the site. These found Fill/topsoil to 0.30m over Clay-with-flints which was typically stiff brown silty CLAY with occasional flints. CHALK was found in five positions in pockets, for example the end or corner of a pit found chalk at a certain depth but this was not present elsewhere in the pit. The depth of chalk was variable and was seen from a minimum of 1.20m, but elsewhere the chalk was not present at the full depth of the pits, which were excavated to between 3.50 and 4.00m. A soakage test was carried out in one of the pits which found chalk in one corner; this gave an infiltration rate of 1.6×10^{-5} m/s. This investigation also included thirty-five dynamic probes which were taken to a maximum depth of 10m; locally, these showed low blow counts at depth, indicating the likely presence of solution features. The desk study associated with this work also identified the known presence of solution features within the vicinity of the site.

In 2009 E&L drilled a number of cable percussion boreholes on the parcel of land immediately east of the northern part of the site and for the spur road which abuts the site to the east. These found topsoil to a maximum depth of 0.40m, over superficial deposits comprising CLAY layers, with a little organic mottling at the top of the formation. Clay generally contained flints, and was locally clayey or silty. The lower clay horizons included a little chalk silt and/or gravel. Below the clay, Upper Chalk was encountered as white CHALK silt with some intact chalk gravel (it should be noted that the action of the drilling tools reduces the chalk, at least in part, to a chalk silt slurry, thus recovered samples do not necessarily represent the nature/structure of the chalk in situ). The top level of the chalk varied significantly across the site from between 1.65m and 9.80m deep (123.26m and 112.35m OD); this is considered likely to indicate significant solution feature activity on the site. Two of the thirteen holes drilled found infilled solution features at depth within otherwise intact chalk. These were found at 16.10m to 17.80m and at 9.20m to 10.20m below ground level. The location of the solution features does not represent a specific area or any particular predictable pattern across the site. All boreholes remained dry whilst open.

Continued/

Falling head soakage tests were carried out in six boreholes across the site, with the exposed section of the borehole being at around 8.00-10.00m. These tests found variable soakage rates, but indicated that deep bored soakaways would be a feasible option for disposing of surface water on the site. For a head of 6.80/7.00m, i.e. water around 2.00m below ground level, infiltration rates in chalk of between 36-206 $l/m^2/min$ were calculated. For a head of 4.80/5.00m, i.e. water level at 4.00m below ground level, the range was 10-44 $l/m^2/min$.

The planning database of Dover District Council was also searched for nearby ground investigation information. None was found, except for the full report prepared by E&L following the above mentioned ground investigation.

Recommendations for Surface Water Drainage

In view of the above information above it can be concluded that it is very likely that solution features will be present on the site. The infill to these features may be susceptible to washout of fine material or collapse settlement, which can result in the formation of a void that will eventually migrate to the surface and cause significant subsidence issues, potentially damaging buildings and critical services, and causing a safety hazard to site staff and users. If damage is caused to water mains or sewers, these would add more water to the shallow soils, exacerbating the problems. Surface water must therefore be kept away from solution features. Foul drainage and water mains must also be designed to be robust and not prone to leakage; in particular, they must be able to resist seasonal movements that will occur at shallow depth in the clay soils present. The design of landscaping for the proposed scheme should keep any tree planting well away from water-bearing (and any other critical) services, since seasonal volume change will be increased within the zone of influence of trees.

In addition, the thickness of the superficial deposits and thus the depth to the surface of the chalk is likely to vary considerably across the site. These deposits will exhibit variable, and likely low soakage rates, given their predominantly clayey nature, but more significantly it will not be possible to determine whether the superficial deposits seen at a given location are above (or indeed within) a solution feature within the chalk.

It is therefore recommended that all surface water be discharged into intact chalk at depth by a series of deep bored soakaways, located at intervals across the site. These must be sealed through any superficial deposits and solution feature infill (including any found at depth, as in the E&L investigation on the adjacent site). Soakaways should be sited as far as is practically possible and certainly no closer than 10m from buildings.

Clean roof water may discharge straight to soakaway chambers, provided this is via sealed down pipes, with no possible access for pollutants. Surface water from car parks, paving and the like should pass through trapped gullies and a well maintained oil interceptor. As noted above, the pipework must be robust and designed to accommodate a degree of ground movement; the National House Building Council Standards, Chapter 4.2, “Building near Trees” has some guidance on this.

The EA may require a permit to discharge surface water over a principal aquifer and are likely to require that discharge of water occurs a certain distance, normally 10m, above the groundwater table.

Swales and unlined ponds (i.e. ‘suds’ features) are not considered to be suitable options for this site as although there is likely to be adequate space, the shallow soils should not be inundated with water. Permeable paving, which mimics the current situation (i.e. rain falling on land and entering the ground at that location) may be acceptable for small, untrafficked areas. The principle is that there should be no concentrated discharge into the ground, except at the deep-bored soakaway locations.

Due to the nature of the proposals for the site, rainwater harvesting may be an option, which would reduce the volume of water discharged to the soakaways, and also the demands of the development for potable water supply.

It is considered that the range of soil infiltration rates noted above, for the adjacent site, could be used for preliminary design purposes. The next stage would be to drill a series of cable percussion boreholes across the site, to determine site-specific infiltration rates, and to assess further the spatial/vertical frequency of solution features. If the boreholes were to be drilled at likely soakaway locations, liner pipes could be installed, capped and buried, and their location accurately recorded, for later use in the development itself.

Continued/

We hope that our report is clear. Please do not hesitate to contact us if you have any queries.

Yours sincerely
For and on behalf of Evans & Langford LLP

Enc.

BGS Infiltration SuDS GeoReport

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

GeoReports

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Infiltration SuDS GeoReport:

This report provides information on the suitability of the subsurface for the installation of infiltration sustainable drainage systems (SuDS). It provides information on the properties of the subsurface with respect to significant constraints, drainage, ground stability and groundwater quality protection.

Report Id: ***GR_213623/1***

Client reference: PO-4706

Search location

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Assessment for an infiltration sustainable drainage system

Introduction

Sustainable drainage systems (SuDS) are drainage solutions that manage the volume and quality of surface water close to where it falls as rain. They aim to reduce flow rates to rivers, increase local water storage capacity and reduce the transport of pollutants to the water environment. There are four main types of SuDS, which are often designed to be used in sequence. They comprise:

- **source control:** systems that control the rate of runoff
- **pre-treatment:** systems that remove sediments and pollutants
- **retention:** systems that delay the discharge of water by providing surface storage
- **infiltration:** systems that mimic natural recharge to the ground.

This report focuses on infiltration SuDS. It provides subsurface information on the properties of the ground with respect to drainage, ground stability and groundwater quality protection. It is intended principally for those involved in the preliminary assessment of the suitability of the ground for infiltration SuDS, and those involved in assessing proposals from others for sustainable drainage, but it may also be useful to help house-holders judge whether or not further professional advice should be sought. If in doubt, users should consult a suitably-qualified professional about the results in this report before making any decisions based upon it.

This GeoReport is structured in two parts:

- **Part 1. Summary data**.

  Comprises three maps that summarise the data contained within Part 2.

- **Part 2. Detailed data**.

  Comprises a further 24 maps in four thematic sections:

  - **Very significant constraints.** Maps highlight areas where infiltration may result in adverse impacts due to factors including: ground instability (soluble rocks, non-coal shallow mining and landslide hazards); persistent shallow groundwater, or the presence of made ground, which may represent a ground stability or contamination hazard.
  - **Drainage potential**. Maps indicate the drainage potential of the ground, by considering subsurface permeability, depth to groundwater and the presence of floodplain deposits.
  - **Ground stability**. Maps indicate the presence of hazards that have the potential to cause ground instability resulting in damage to some buildings and structures, if water is infiltrated to the ground.
  - **Groundwater protection**. Maps provide key indicators to help determine whether the groundwater may be susceptible to deterioration in quality as a result of infiltration.

This report considers the suitability of the subsurface for the installation of infiltration SuDS, such as soakaways, infiltration basins or permeable pavements. It provides subsurface data to indicate whether, and which type of infiltration system may be appropriate. It does not state that infiltration SuDS are, or are not, appropriate as this is highly dependent on the design of the individual system. This report therefore describes the subsurface conditions at the site, allowing the reader to determine the suitability of the site for infiltration SuDS.

The map and text data in this report is similar to that provided in the '*Infiltration SuDS Map: Detailed'* national map product. For further information about the data, consult the '*User Guide for the Infiltration SuDS Map: Detailed'*, available from http://nora.nerc.ac.uk/16618/.

PART 1: SUMMARY DATA

This section provides a summary of the data on the following pages.

In terms of the drainage potential, is the ground suitable for infiltration SuDS?

Highly compatible for infiltration SuDS.
The subsurface is likely to be suitable for free-draining infiltration SuDS.

Probably compatible for infiltration SuDS.
The subsurface is probably suitable although the design may be influenced by the ground conditions.

Opportunities for bespoke infiltration SuDS.
The subsurface is potentially suitable although the design will be influenced by the ground conditions.

Very significant constraints are indicated.
There is a very significant potential for one or more hazards associated with infiltration.

Is ground instability likely to be a problem?

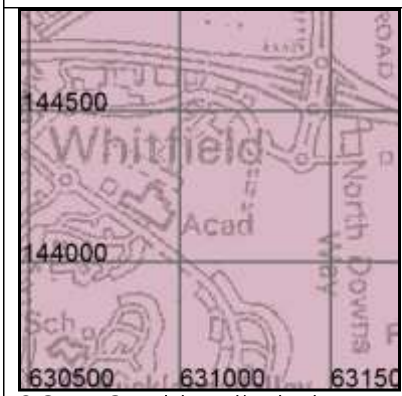
Increased infiltration is very unlikely to result in ground instability.

Ground instability problems may be present or anticipated, but increased infiltration is unlikely to result in ground instability

Ground instability problems are probably present. Increased infiltration may result in ground instability.

There is a very significant potential for one or more geohazards associated with infiltration.

Is the groundwater susceptible to deterioration in quality?



The groundwater is not expected to be especially vulnerable to contamination.

The groundwater may be vulnerable to contamination.

The groundwater is likely to be vulnerable to contaminants.

Made ground is present at the surface. Infiltration may increase the possibility of remobilising pollutants.

PART 2: DETAILED DATA

This section provides further information about the properties of the ground and will help assess the suitability of the ground for infiltration SuDS.

Section 1. Very significant constraints

Where maps are overlain by grey polygons, geological or hydrogeological hazards may exist that could be made worse by infiltration. The following hazards are considered:

- soluble rocks
- landslides
- shallow mining
- shallow groundwater
- made ground

For more information read 'Explanation of terms' at the end of this report.

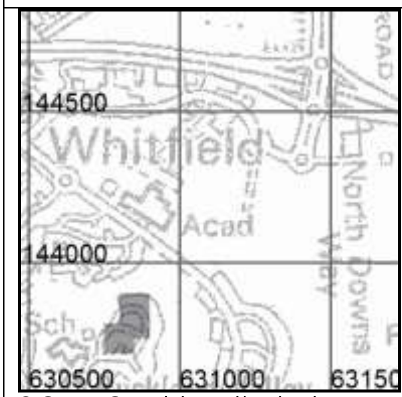
Soluble rock hazard

- [x] Very significant soluble rock hazard.

Soluble rocks are present with a very significant possibility of localised subsidence that could be initiated or made worse by infiltration. The site investigation should consider whether the potential for or the consequences of subsidence as a result of infiltration are significant.

- [ ] Very significant soluble rock hazards are not present; however this hazard may still need to be considered. See Part 3.

Landslide hazard

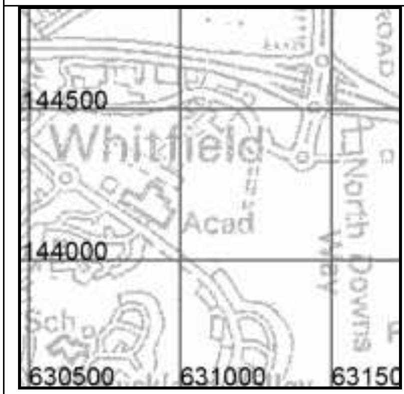


- [x] Very significant landslide hazard.

Slope instability problems are almost certainly present and may be active. An increase in moisture content as a result of infiltration may cause the slope to fail. The site investigation should consider whether the potential for or the consequences of landslide as a result of infiltration are significant.

- [ ] Very significant landslide hazards are not present; however this hazard may still need to be considered. See Part 3.

Shallow mining hazard

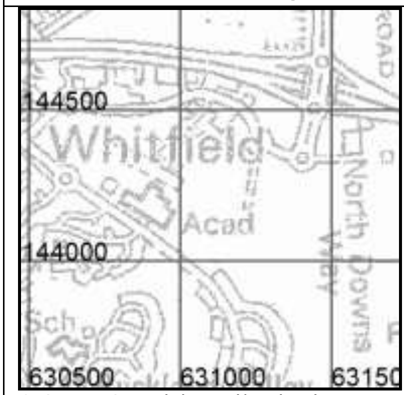


Very significant mining hazard.

Shallow mining is likely to be present with a very significant possibility of localised subsidence that could be initiated or made worse by increased infiltration. Also, infiltration may increase the possibility of remobilising pollutants. The site investigation should consider whether the potential for or consequences of subsidence and/or remobilisation of pollutants as a result of infiltration are significant.

Very significant mining hazards are not present; however this hazard may still need to be considered. See Part 3.

Persistent shallow groundwater



Very high likelihood of persistent or seasonally shallow groundwater.

Persistent or seasonally shallow groundwater is likely to be present. Infiltration may increase the likelihood of soakaway inundation, or groundwater emergence at the surface. The site investigation should consider whether the potential for or the consequences of groundwater level rise as a result of infiltration are significant.

See Part 2 for the likely depth to water table.

Made ground

Made ground present.

Made ground is present at the surface. Infiltration may affect ground stability or increase the possibility of remobilising pollutants. The site investigation should consider whether the potential for or consequences of ground instability and/or pollutant leaching as a result of infiltration are significant.

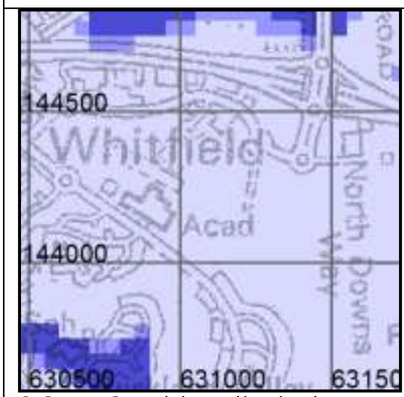
None recorded

Section 2. Drainage potential

The following pages contain maps that will help you assess the drainage potential of the ground by considering the:

- depth to water table
- permeability of the superficial deposits
- thickness of the superficial deposits
- permeability of the bedrock
- presence of floodplains

Superficial deposits are not present everywhere and therefore some areas of the *superficial deposit permeability* map may not be coloured. Where this is the case, the *bedrock permeability* map shows the likely permeability of the ground. Superficial deposits in some places are very thin and hence in these places you may wish to consider both the permeability of the superficial deposits and the permeability of the bedrock. The *superficial thickness* map will tell you whether the superficial deposits are thin (< 3 m thick) or thick (>3 m). Where they are over 3 m thick, the permeability of the bedrock may not be relevant.
For more information read ‘Explanation of terms’ at the end of this report.

Depth to groundwater table	
 © Crown Copyright and/or database right 2016. All rights reserved. **Licence number 100021290 EUL**	Groundwater is likely to be **more than 5 m** below the ground surface throughout the year.
	Groundwater is likely to be between **3 and 5 m** below the ground surface for at least part of the year.
	Groundwater is likely to be **less than 3 m** below the ground surface for at least part of the year.

Superficial deposit permeability

Superficial deposits are likely to be **free-draining**.

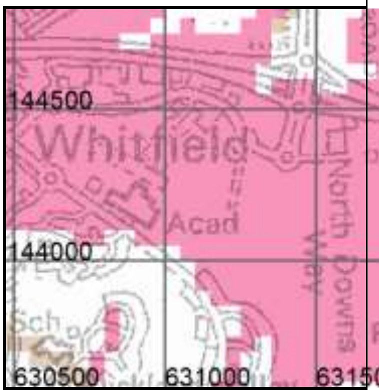
The superficial deposit permeability is **spatially variable**, but likely to permit moderate infiltration.

Superficial deposits are likely to be **poorly draining**.

These maps show the permeability range that is summarised above.

- Very Low
- Low
- Moderate
- High
- Very High

Minimum



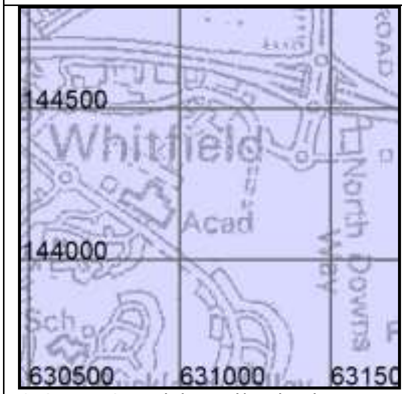
Maximum

Superficial deposit thickness

The thickness of superficial deposits is **< 3 m** and hence the permeability of the ground may be dependent on both the superficial deposits (where present) and underlying bedrock (see below).

The thickness of superficial deposits is **> 3 m** and hence the permeability of the superficial deposits is likely to determine the permeability of the ground.

Bedrock permeability



Bedrock deposits are likely to be **free-draining**.

The bedrock permeability is **spatially variable**, but likely to permit moderate infiltration.

Bedrock deposits are likely to be **poorly draining**.

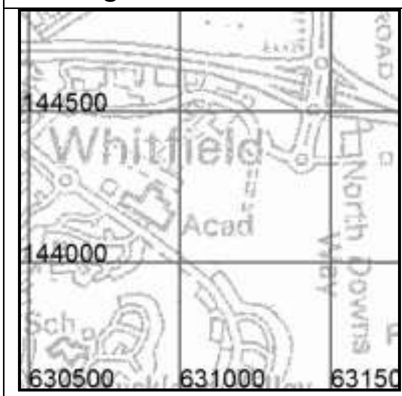
These maps show the permeability range that is summarised above.

Key
- Very Low
- Low
- Moderate
- High
- Very High

Minimum

Maximum

Geological indicators of flooding



Superficial floodplain deposits or low-lying coastal areas have been identified. Groundwater levels may rise in response to high river or tide levels, potentially causing inundation of subsurface infiltration SuDS.

Section 3. Ground stability

The following pages contain maps that will help you assess whether infiltration may impact the stability of the ground. They consider hazards associated with:

- soluble rocks
- landslides
- shallow mining
- running sands
- swelling clays
- compressible ground, and
- collapsible ground

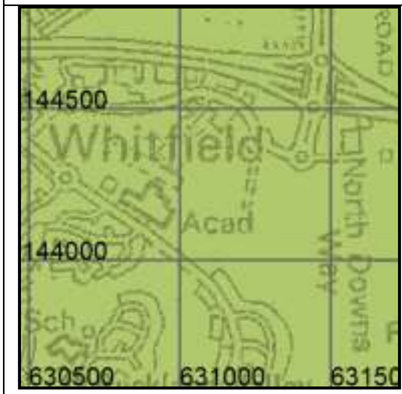
In the following maps, geohazards that are identified in green are unlikely to prevent infiltration SuDS from being installed, but they should be considered during design. For more information read 'Explanation of terms' at the end of this report.

Soluble rocks	
 © Crown Copyright and/or database right 2016. All rights reserved. **Licence number 100021290 EUL**	Increased infiltration is unlikely to result in subsidence.
	Increased infiltration is unlikely to cause localised subsidence, but potential impacts should be considered.
	Increased infiltration may result in localised subsidence. The potential for or the consequences of subsidence associated with soluble rocks should be considered.
	Very significant possibility of localised subsidence that could be initiated or made worse by infiltration.

Landslides

- Increased infiltration is unlikely to lead to slope instability.
- Slope instability problems may be present or anticipated, but increased infiltration is unlikely to cause instability
- Slope instability problems are probably present or have occurred in the past, and increased infiltration may result in slope instability.
- Slope instability problems are almost certainly present and may be active. An increase in moisture content as a result of infiltration may cause the slope to fail.

Shallow mining



- Increased infiltration is unlikely to lead to subsidence.
- Shallow mining is possibly present. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
- Shallow mining could be present with a significant possibility that localised subsidence could be initiated or made worse by increased infiltration.
- Shallow mining is likely to be present, with a very significant possibility that localised subsidence may be initiated or made worse by increased infiltration.

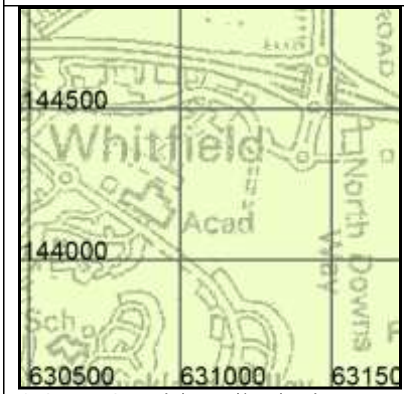
Running sand

- Increased infiltration is unlikely to cause ground collapse associated with running sands.
- Running sand is possibly present. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
- Significant possibility for running sand problems. Increased infiltration may result in a geohazard.

Swelling clays

(very pale green)	Increased infiltration is unlikely to cause shrink-swell ground movement.
(light green)	Ground is susceptible to shrink-swell ground movement. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
(dark green)	Ground is susceptible to shrink-swell ground movement. Increased infiltration may result in a geohazard.

Compressible ground



(very pale green)	Increased infiltration is unlikely to lead to ground compression.
(dark green)	Compressibility and uneven settlement hazards are probably present. Increased infiltration may result in a geohazard.

Collapsible ground

(very pale green)	Increased infiltration is unlikely to result in subsidence.
(light green)	Deposits with potential to collapse when loaded and saturated are possibly present in places. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
(dark green)	Deposits with potential to collapse when loaded and saturated are probably present in places. Increased infiltration may result in a geohazard.

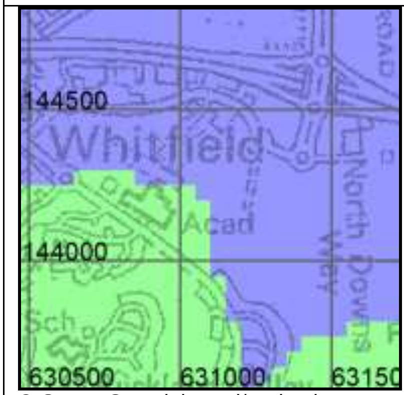
Section 4. Groundwater quality protection

The following pages contain maps showing some of the information required to ensure the protection of groundwater quality. Data presented includes:

- groundwater source protection zones (Environment Agency data)
- predominant flow mechanism
- made ground

For more information read ‘Explanation of terms’ at the end of this report.

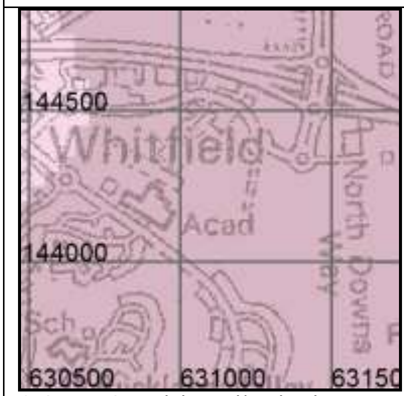
Groundwater source protection zones



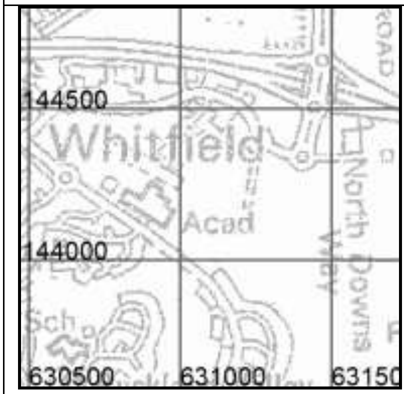
Derived in part from Source Protection Zone data provided under licence from the Environment Agency © Environment Agency 2016.

(white)	Groundwater is not within a source protection zone.
(brown)	Source protection zone IV
(blue)	Source protection zone III
(green)	Source protection zone II
(red)	Source protection zone I.

Predominant flow mechanism



(light pink)	Water is likely to percolate through the unsaturated zone to the groundwater through either the pore space in granular media or through porespace and fractures; these processes have some potential for contaminant removal and breakdown.
(mauve)	Water is likely to percolate through the unsaturated zone to the groundwater through fractures, a process which has little potential for contaminant removal and breakdown.

Made ground	
 © Crown Copyright and/or database right 2016. All rights reserved. **Licence number 100021290 EUL**	Made ground is present at the surface. Infiltration may increase the possibility of remobilising pollutants.

Section 5. Geological Maps

The following maps show the artificial, superficial and bedrock geology within the area of interest.

Artificial deposits

Superficial deposits

Bedrock

Fault

Coal, ironstone or mineral vein

Note: Faults and Coals, ironstone & mineral veins are shown for illustration and to aid interpretation of the map. Not all such features are shown and their absence on the map face does not necessarily mean that none are present

Key to Artificial deposits:
No deposits recorded by BGS in the search area

Key to Superficial deposits:

Map colour	Computer Code	Rock name	Rock type
	HEAD-XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
	HEAD-XZV	HEAD	SILT AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
	CWF-XCZSV	CLAY-WITH-FLINTS FORMATION	CLAY, SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]

Key to Bedrock geology:

Map colour	Computer Code	Rock name	Rock type
	MACK-CHLK	MARGATE CHALK MEMBER	CHALK
	SECK-CHLK	SEAFORD CHALK FORMATION	CHALK
	LECH-CHLK	LEWES NODULAR CHALK FORMATION	CHALK

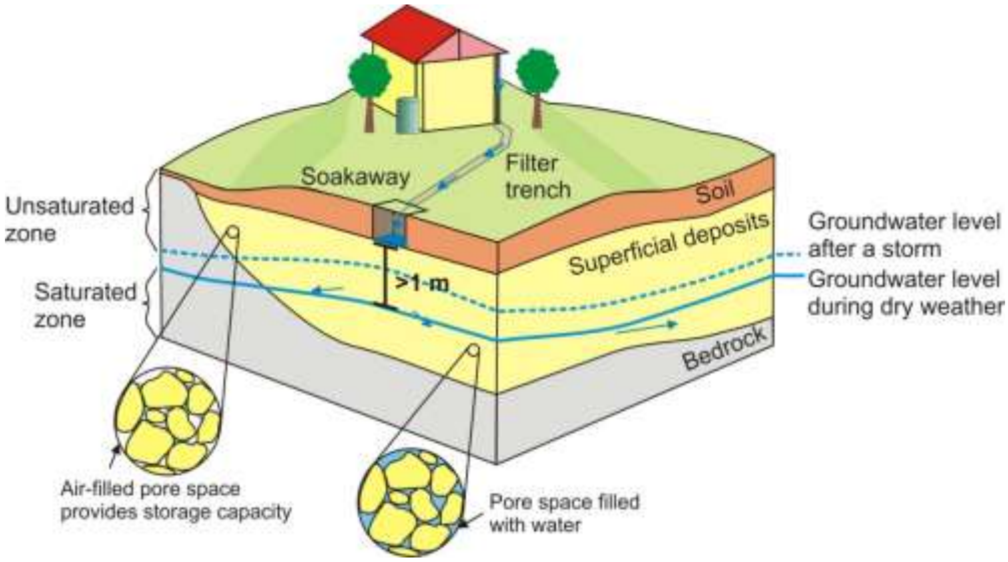
Limitations of this report:

- This report is concerned with the potential for infiltration-to-the-ground to be used as a SuDS technique at the site described. It only considers the subsurface beneath the search area and does NOT consider potential surface or subsurface impacts outside of that area.
- This report is NOT an alternative for an on-site investigation or soakaway test, which might reach a different conclusion.
- This report must NOT be used to justify disposal of foul waste or grey water.
- This report is based on and limited to an interpretation of the records held by the British Geological Survey (BGS) at the time the search is performed. The datasets used (with the exception of that showing depth to water table) are based on 1:50 000 digital geological maps and not site-specific data.
- Other more specific and detailed ground instability information for the site may be held by BGS, and an assessment of this could result in a modified assessment.
- To interpret the maps correctly, the report must be viewed and printed in colour.
- The search does NOT consider the suitability of sites with regard to:
    - previous land use,
    - potential for, or presence of contaminated land
    - presence of perched water tables
    - shallow mining hazards relating to coal mining. Searches of coal mining should be carried out via The Coal Authority Mine Reports Service: www.coalminingreports.co.uk.
    - made ground, where not recorded
    - proximity to landfill sites (searches for landfill sites or contaminated land should be carried out through consultation with local authorities/Environment Agency)
    - zones around private water supply boreholes that are susceptible to groundwater contamination.
- This report is supplied in accordance with the GeoReports Terms & Conditions available separately, and the copyright restrictions described at the end of this report

Explanation of terms

Depth to groundwater

In the shallow subsurface, the ground is commonly unsaturated with respect to water. Air fills the spaces within the soil and the underlying superficial deposits and bedrock. At some depth below the ground surface, there is a level below which these spaces are full of water. This level is known as the groundwater level, and the water below it is termed the groundwater. When water is infiltrated, the groundwater level may rise temporarily. To ensure that there is space in the unsaturated zone to accommodate this, there should be a minimum thickness of 1 m between the base of the infiltration system and the water table. An estimate of the *depth to groundwater* is therefore useful in determining whether the ground is suitable for infiltration.



Groundwater flooding

Groundwater flooding occurs when a rise in groundwater level results in very shallow groundwater or the emergence of groundwater at the surface. If infiltration systems are installed in areas that are susceptible to groundwater flooding, it is possible that the system could become inundated. The susceptibility map seeks to identify areas where the geological conditions and water tables indicate that groundwater level rise could occur under certain circumstances. A high susceptibility to groundwater flooding classification does not mean that groundwater flooding has ever occurred in the past, or will do so in the future as the susceptibility maps do not contain information on how often flooding may occur. The susceptibility maps are designed for planning; identifying areas where groundwater flooding might be an issue that needs to be taken into account.

Geological indicators of flooding

In floodplain deposits, groundwater level can be influenced by the water level in the adjacent river. Groundwater level may increase during periods of fluvial flood and therefore this should be taken into account when designing infiltration systems on such deposits. The *geological indicators of flooding* dataset shows where there is geological evidence (floodplain deposits) that flooding has occurred in the past.

For further information on flood-risk, the likely frequency of its recurrence in relation to any proposed development of the site, and the status of any flood prevention measures in place, you are advised to contact the local office of the Environment Agency (England and Wales) at www.environment-agency.gov.uk/ or the Scottish Environment Protection Agency (Scotland) at www.sepa.org.uk.

Artificial ground

Artificial ground comprises deposits and excavations that have been created or modified by human activity. It includes ground that is worked (quarries and road cuttings), infilled (back-filled quarries), landscaped (surface re-shaping), disturbed (near surface mineral workings) or classified as made ground (embankments and spoil heaps). The composition and properties of artificial ground are often unknown. In particular, the permeability and chemical composition of the artificial ground should be determined to ensure that the ground will drain and that any contaminants present will not be remobilised.

Superficial permeability

Superficial deposits are those geological deposits that were formed during the most recent period of geological time (as old as 2.6 million years before present). They generally comprise relatively thin deposits of gravel, sand, silt and clay and are present beneath the pedological soil in patches or larger spreads over much of Britain. The ease with which water can percolate through these deposits is controlled by their permeability and varies widely depending on their composition. Those deposits comprising clays and silts are less permeable and thus infiltration is likely to be slow, such that water may pool on the surface. In comparison, deposits comprising sands and gravels are more permeable allowing water to percolate freely.

Bedrock permeability

Bedrock forms the main mass of rock forming the Earth. It is present everywhere, commonly beneath superficial deposits. Where the superficial deposits are thin or absent, the ease with which water will percolate into the ground depends on the permeability of the bedrock.

Natural ground instability

Natural ground instability refers to the propensity for upward, lateral or downward movement of the ground that can be caused by a number of natural geological hazards (e.g. ground dissolution/compressible ground). Some movements associated with particular hazards may be gradual and of millimetre or centimetre scale, whilst others may be sudden and of metre or tens of metres scale. Significant natural ground instability has the potential to cause damage to buildings and structures, especially when the drainage characteristics of a site are altered. It should be noted, however, that many buildings, particularly more modern ones, are built to such a standard that they can remain unaffected in areas of significant ground movement.

Shrink-swell

A shrinking and swelling clay changes volume significantly according to how much water it contains. All clay deposits change volume as their water content varies, typically swelling in winter and shrinking in summer, but some do so to a greater extent than others. Contributory circumstances could include drought, leaking service pipes, tree roots drying-out the ground or changes to local drainage patterns, such as the creation of soakaways. Shrinkage may remove support from the foundations of buildings and structures, whereas clay expansion may lead to uplift (heave) or lateral stress on part or all of a structure; any such movements may cause cracking and distortion.

Landslides (slope stability)

A landslide is a relatively rapid outward and downward movement of a mass of ground on a slope, due to the force of gravity. A slope is under stress from gravity but will not move if its strength is greater than this stress. If the balance is altered so that the stress exceeds the strength, then movement will occur. The stability of a slope can be reduced by removing ground at the base of the slope, by placing material on the slope, especially at the top, or by increasing the water content of the materials forming the slope. Increase in subsurface water content beneath a soakaway could increase susceptibility to landslide hazards. The assessment of landslide hazard refers to the stability of the present land surface. It does not encompass a consideration of the stability of excavations.

Soluble rocks (dissolution)

Some rocks are soluble in water and can be progressively removed by the flow of water through the ground. This process tends to create cavities, potentially leading to the collapse of overlying materials and possibly subsidence at the surface. The release of water into the subsurface from infiltration systems may increase the dissolution of rock or destabilise material above or within a cavity. Dissolution cavities may create a pathway for rapid transport of contaminated water to an aquifer or water course.

Compressible ground
Many ground materials contain water-filled pores (the spaces between solid particles). Ground is compressible if a building (or other load) can cause the water in the pore space to be squeezed out, causing the ground to decrease in thickness. If ground is extremely compressible the building may sink. If the ground is not uniformly compressible, different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. The compressibility of the ground may alter as a result of changes in subsurface water content caused by the release of water from soakaways.

Collapsible deposits
Collapsible ground comprises certain fine-grained materials with large pore spaces (the spaces between solid particles). It can collapse when it becomes saturated by water and/or a building (or other structure) places too great a load on it. If the material below a building collapses it may cause the building to sink. If the collapsible ground is variable in thickness or distribution, different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. The subsurface underlying a soakaway will experience an increase in water content that may affect the stability of the ground. This hazard is most likely to be encountered only in parts of southern England.

Running sand
Running sand conditions occur when loosely-packed sand, saturated with water, flows into an excavation, borehole or other type of void. The pressure of the water filling the spaces between the sand grains reduces the contact between the grains and they are carried along by the flow. This can lead to subsidence of the surrounding ground. Running sand is potentially hazardous during the drainage system installation. During installation, excavation of the ground may create a space into which sand can flow, potentially causing subsidence of surrounding ground.

Shallow mining hazards (non coal)
Current or past underground mining for coal or for other commodities can give rise to cavities at shallow or intermediate depths, which may cause fracturing, general settlement, or the formation of crown-holes in the ground above. Spoil from mineral workings may also present a pollution hazard. The release of water into the subsurface from soakaways may destabilise material above or within a cavity. Cavities arising as a consequence of mining may also create a pathway for rapid transport of contaminated water to an aquifer or watercourse. The mining hazards map is derived from the geological map and considers the potential for subsidence associated with mining on the basis of geology type. Therefore if mining is known to occur within a certain rock, the map will highlight the potential for a hazard within the area covered by that geology.

For more information regarding underground and opencast **coal mining**, the location of mine entries (shafts and adits) and matters relating to subsidence or other ground movement induced by **coal mining** please contact the Coal Authority, Mining Reports, 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG; telephone 0845 762 6848 or at www.coal.gov.uk**.** For more information regarding other types of mining (i.e. non-coal), please contact the British Geological Survey.

Groundwater source protection zones

In England and Wales, the Environment Agency has defined areas around wells, boreholes and springs that are used for the abstraction of public drinking water as source protection zones. In conjunction with Groundwater Protection Policy the zones are used to restrict activities that may impact groundwater quality, thereby preventing pollution of underlying aquifers, such that drinking water quality is upheld. The Environment Agency can provide advice on the location and implications of source protection zones in your area (www.environment-agency.gov.uk/)

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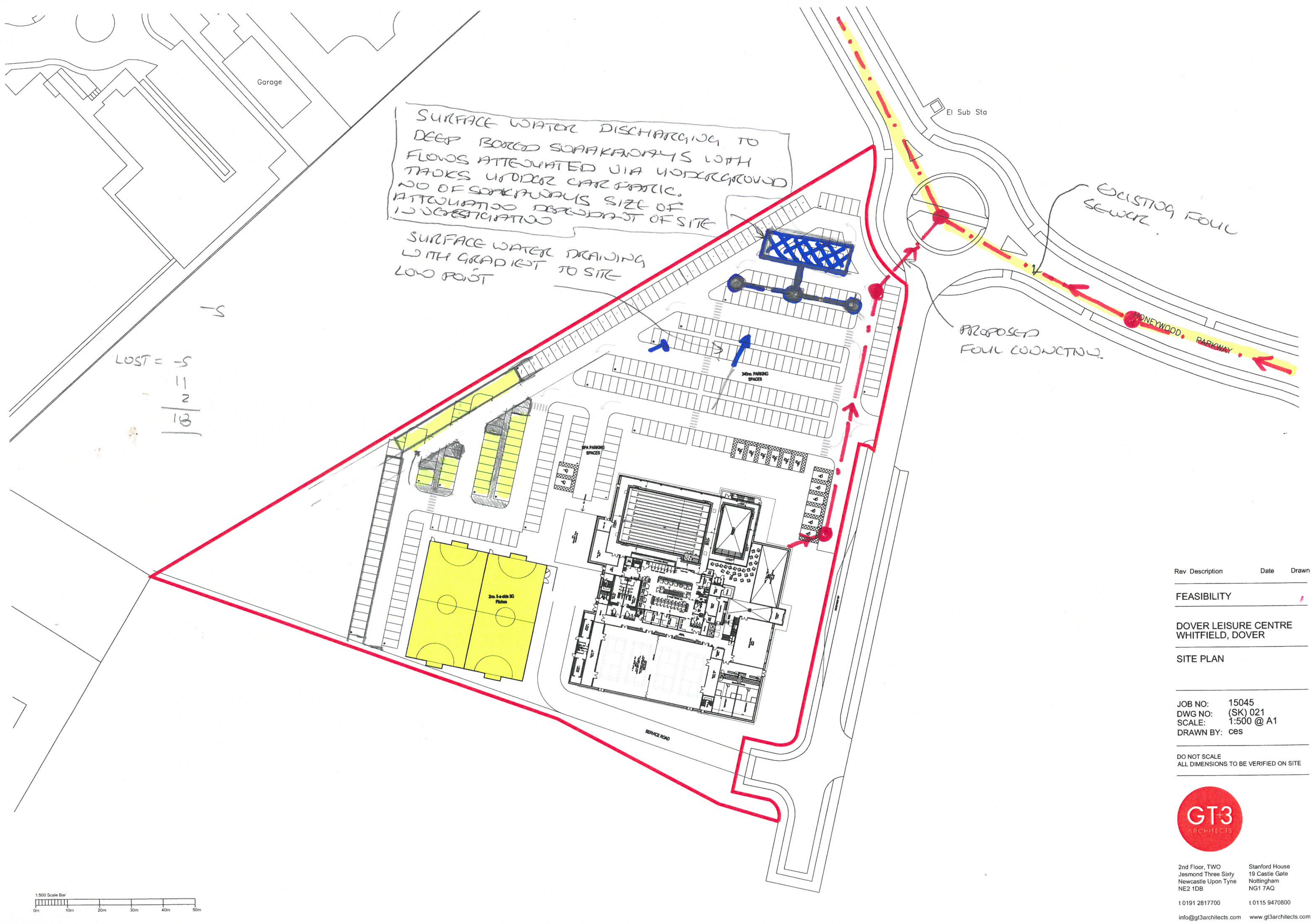
- The data, information and related records supplied in this Report by BGS can only be indicative and should not be taken as a substitute for specialist interpretations, professional advice and/or detailed site investigations. You must seek professional advice before making technical interpretations on the basis of the materials provided.
- Geological observations and interpretations are made according to the prevailing understanding of the subject at the time. The quality of such observations and interpretations may be affected by the availability of new data, by subsequent advances in knowledge, improved methods of interpretation, and better access to sampling locations.
- Raw data may have been transcribed from analogue to digital format, or may have been acquired by means of automated measuring techniques. Although such processes are subjected to quality control to ensure reliability where possible, some raw data may have been processed without human intervention and may in consequence contain undetected errors.
- Detail, which is clearly defined and accurately depicted on large-scale maps, may be lost when small-scale maps are derived from them.
- Although samples and records are maintained with all reasonable care, there may be some deterioration in the long term.
- The most appropriate techniques for copying original records are used, but there may be some loss of detail and dimensional distortion when such records are copied.
- Data may be compiled from the disparate sources of information at BGS's disposal, including material donated to BGS by third parties, and may not originally have been subject to any verification or other quality control process.
- Data, information and related records, which have been donated to BGS, have been produced for a specific purpose, and that may affect the type and completeness of the data recorded and any interpretation. The nature and purpose of data collection, and the age of the resultant material may render it unsuitable for certain applications/uses. You must verify the suitability of the material for your intended usage.
- If a report or other output is produced for you on the basis of data you have provided to BGS, or your own data input into a BGS system, please do not rely on it as a source of information about other areas or geological features, as the report may omit important details.
- The topography shown on any map extracts is based on the latest OS mapping and is not necessarily the same as that used in the original compilation of the BGS geological map, and to which the geological linework available at that time was fitted.
- Note that for some sites, the latest available records may be quite historical in nature, and while every effort is made to place the analysis in a modern geological context, it is possible in some cases that the detailed geology at a site may differ from that described.

Report issued by
BGS Enquiry Service



Rev	Description	Date	Drawn

FEASIBILITY

DOVER LEISURE CENTRE
WHITFIELD, DOVER

SITE PLAN

JOB NO: 15045
DWG NO: (SK) 021
SCALE: 1:500 @ A1
DRAWN BY: ces

DO NOT SCALE
ALL DIMENSIONS TO BE VERIFIED ON SITE

GT+3 ARCHITECTS

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Appendix 6 – Sequential Test Report and Initial Highways Advice from KCC

Dover Leisure Centre

Sequential Test Assessment

Dover District Council

FINAL DRAFT

June 2016

MB/11443

Contents

1 Introduction

1.1 Purpose of this Report

1.1.1 DHA Planning has been instructed by The Sports Consultancy on behalf of Dover District Council to prepare an independent Sequential Test assessment in relation to the development of a new Dover Leisure Centre, that is proposed to involve the relocation of the centre from its existing edge of town centre site to an out of centre location at White Cliffs Business Park, Whitfield. The development is to include an 8 lane swimming pool, learner pool, 4 court sports hall, 120 station health and fitness studio, 3 multi-activity studios, spin studio, 2 squash courts, changing rooms, toilets, equipment storage, reception, offices/back of house, cafe and sufficient parking spaces and service areas. The proposals also include outdoor changing rooms and two 5-a-side 3G football pitches.

1.1.2 In accordance with the requirements set out in the National Planning Policy Framework (NPPF), this Sequential Test considers the availability, suitability and viability of potential alternative sites in existing centres and edge of centre locations.

1.1.3 The Sports Consultancy, in partnership with GT Architects, Faithful+Gould and Hadron Consulting, were appointed by Dover District Council in July 2015 to complete an initial feasibility and options appraisal study for the improvement and replacement of the existing Dover Leisure Centre. The Feasibility and Options Appraisal Study for Dover Leisure Centre' was published in 2015.

1.1.4 This original feasibility work has provided an extremely useful starting point and evidence base for this report, although DHA Planning have subsequently undertaken a further independent review of the identified need for sports facilities within Dover, to establish what the correct baseline should be in terms of the Sequential Test. Potential alternative sites have also been sought and assessed independently, having regard to and critically assessing the content of the work already carried out.

1.1.5 As such, DHA have produced this standalone document, which considers the leisure centre development with specific regard to the Sequential Test and strict planning methodology this applies.

2 Identifying the Need

2.1 District-Wide Context

2.1.1 As the Government's 'Sporting Future: A New Strategy for an Active Nation' (December 2015) sets out, sport is a key part of local communities and Councils have an important leadership role to play, bringing schools, voluntary sport clubs, National Governing Bodies of sport (NGBs), health and the private sector together to forge partnerships, unblock barriers to participation and improve the local sport delivery system. So local authorities have, and will continue to have, an absolutely crucial role to play in delivering sport and physical activity opportunities.

2.1.2 Dover District Council already recognises that there is a need within Dover for the provision of leisure facilities including opportunities for sport, play and relaxation to improve. In this case Dover District Council aim to take this opportunity to significantly improve the provision of indoor sports facilities in Dover. The aspiration is to provide a broader base of facilitates than are currently available and the Council have recently consulted on their draft Indoor Sports Facility Strategy (February 2016), which considers existing and future supply and usage to provide recommendations for future delivery.

2.1.3 As part of the original feasibility work, a detailed needs analysis was conducted to identify the current and future (up to 2026) provision required to meet the indoor sport facility needs of Dover Residents. The Facility Planning Model (FPM) reports from Sports England (2015), the Latent Demand Report for Health and Fitness Membership and various stakeholder consultations were used to assess the needs in the area and the feasibility dovetails with the Indoor Sports Facility Strategy work and needs identified therein.

2.1.4 In summary in the feasibility and draft strategy it was identified that the district in particular has a low level of swimming pool provision of 8.88m^2 water space per 1,000 population in Dover. In terms of the other forms of provision, it was identified that overall the district has a relatively low level of sports hall provision (3+ court) but with improved projected supply, that indoor bowls provision is sufficient to meet need, and that there is no additional requirement for squash courts or indoor tennis courts. It has been noted that there is latent demand for gymnastics, health and fitness suites and dance and aerobic studios. From the outcomes of the detailed needs analysis, the following recommendations for a new Dover Leisure Centre were provided in the feasibility:

- Main Pool - 6 or 8 lane 25m pool (6 to replace the existing provision and 8 to increase provision);
- Learner Pool – learner pool with moveable floor;
- Sports Hall – 4-8 courts to be considered – although the 2026 projections noted in the draft strategy assume 4 court provision and show improved supply;
- Health and fitness – 120 stations could be supported;
- Multi activity studio – 2-3 studios;

- Spin studio – spin studio provided in larger facility options;
- Squash courts – maximum of 3 courts; and
- Parking spaces –requirements based on scale of facility option and KCC parking standards.

2.2 Options

2.2.1 The first option is the 'do nothing' option and instead maintain the existing facility at its present level. This is not a feasible option. The facilities at Dover Leisure Centre were built in the 1970s and have now come to the end of their operational life span, as is recognised within the adopted Core Strategy (paragraph 2.55) and the more recent detailed feasibility report.

2.2.2 The second option involves the refurbishment of the existing Dover Leisure Centre facilities. The refurbishment would involve retaining some or all of the existing buildings and undertaking significant works to reconfigure the building to provide an appropriate range of facilities required. This is also not a feasible option. The feasibility confirms that refurbishment and reconstruction will only extend the life of the building for another 20 years and in terms of cost is deemed to be only marginally less expensive compared to the new build options. Furthermore, the centre would be closed for a period of between 12-18 months to allow for the refurbishment works to be carried out and subsequently would not allow for a continuity in service. Continuity of service provision is key and a fundamental requirement. The existing leisure centre is the primary indoor sports facility in the principal urban settlement in the District, the importance of which is recognised within the Core Strategy and draft Indoor Sports Facility Strategy. Its loss for any lengthy period of time would therefore have significant impacts which the Council, as service provider, have confirmed would not be something that could be entertained.

2.2.3 In addition to the refurbishment of the existing centre, five new build options were considered in the 2015 feasibility study, in response to the identified current and future needs of the catchment population. The new build options provide a long-term solution and the opportunity to provide a high quality efficient leisure centre, which contributes to meeting the needs of the District. A new build option would also allow for the continuity of service of the existing Dover Leisure Centre if an alternative suitable site is chosen for the new leisure facilities. A summary of the refurbishment option and the five new build options presented in the feasibility is provided overleaf.

Refurbishment	New Build Option 1	New Build Option 2	New Build Option 3	New Build Option 4	New Build Option 5
6 lane x 25m pool	6 lane x 25m pool	6 lane x 25m pool	6 lane x 25m pool	8 lane x 25m pool	8 lane x 25m pool
Learner pool	15m x 8.5m learner pool (moveable floor)	15m x 8.5m learner pool (moveable floor)	15m x 8.5m learner pool (moveable floor)	15m x 8.5m learner pool (moveable floor)	15m x 8.5m learner pool (moveable floor)
8 court sports hall	No sports hall	4 court sports hall	8 court sports hall	4 court sports hall	8 court sports hall
65 health & fitness stations	120 health & fitness studios	120 health & fitness studios	120 health & fitness studios	120 health & fitness studios	120 health & fitness studios
1 multi activity studio	2 multi activity studios	2 multi activity studios	3 multi activity studios	3 multi activity studios	3 multi activity studios
No spin studio	No spin studio	No spin studio	1 spin studio	1 spin studio	1 spin studio
3 squash courts	0 squash courts	0 squash courts	3 squash courts	3 squash courts	3 squash courts
90 parking spaces	160 parking spaces	200 parking spaces	250 parking spaces	250 parking spaces	250 parking spaces

Table 2.1 Feasibility Options Summary

2.2.4 As the 2015 feasibility study concludes, the new build option is the preferred route for Dover Leisure Centre. Whilst it will have higher cost implications, a new build is deemed to be more viable and will result in the provision of higher quality leisure facilities. A new centre could be built on an alternative site, allowing the existing centre to remain operational for the duration of the build period and allowing for the continuity in the service provision.

2.2.5 In line with the detailed needs analysis, new build option 4 has been chosen by the Council as the baseline position from which to develop a proposed facility mix and is considered to be the most suitable option in terms of meeting the identified needs for the wider district. In particular, it accommodates the larger 8 lane pool which is identified as the main deficiency within the district. The provision of a 4 court sports hall was also considered sufficient despite the existing centre comprising 8 courts, as the draft Indoor Sports Facility Strategy has already accounted for this.

2.2.6 In developing a proposed facility mix, the Council have taken Option 4 as the starting point and undertaken a more comprehensive costing and viability exercise whilst also visiting comparable facilities to note successful and not so successful designs and facilities. This has informed development of the facility mix and design that is being taken forward to planning application stage and includes the following changes from the feasibility Option 4 mix:

- Provision of 2 squash courts instead of 3;
- Increased parking provision to c. 340 spaces;

- Outdoor changing with 2 external 3G 5-a-side football pitches;

- Provision of children's soft play and/or 'clip and climb' facility to broaden facility offer and enhance viability

2.2.7 Whilst the 4 court sports hall provision has been considered sufficient in light of the draft Indoor Sports Facility Strategy and projected supply, further review of evidence of need and visiting other facilities with a similar offer has identified the importance of additional 5-a-side 3G pitch provision, intrinsically linked to the wider facility. This is different to an associated multi-use 3G pitch as was originally mooted in the feasibility study and has emerged as a fundamental component of the facility mix, relieving pressure and demand placed upon the sports hall for other uses.

2.2.8 In view of the extensive feasibility undertaken by the Council and their specialist consultant team, and having reviewed this work, this and the subsequent refinement of Option 4 is considered to represent a robust and reasonable basis upon which to base this Sequential Test Assessment.

2.2.9 Whilst the above mix is being taken forward, it should be noted that the Indoor Sports Facility Strategy remains in draft form and consultation responses received during the recent consultation exercise are being reviewed. Any change to the strategy as a result of this should trigger a review of the proposed mix and in turn this report.

3 Planning Policy Background

3.1 The NPPF and the Need for a Sequential Assessment

3.1.1 Paragraph 24 of the NPPF requires planning applications for main town centre uses that are not in an existing centre and are not in accordance with an up to date development plan to be supported by a sequential assessment which assesses alternative sites according to the prescribed hierarchy of location i.e. defined town centres, followed by edge of centre locations. PPS4, which previously dealt with town centre issues, has now been superseded by the NPPF and the corresponding Practice Guidance note has also been superseded by the Planning Practice Guidance which details the methodology that should apply.

3.1.2 The assessment should not only identify alternative sites but assess their availability, suitability and viability as an alternative option to the application proposal. The objective for such an assessment is to establish whether there are any other alternative sites that are in sequentially preferable locations that could reasonably and suitably accommodate and deliver the proposed development.

3.1.3 In this instance, the proposed redevelopment of the existing Dover Leisure Centre at White Cliffs Business Park falls outside of any defined town centre, and the proposed leisure centre is classed as a 'main town centre use' under the terms of the NPPF. The NPPF Glossary at Appendix 2 defines 'main town centre uses' and includes *"leisure, entertainment facilities the more intensive sport and recreation uses (including cinemas, restaurants, drive-through restaurants, bars and pubs, night-clubs, casinos, health and fitness centres indoor bowling centres, and bingo halls)"*. A leisure centre fits within this description and thus a sequential test is required in accordance with Paragraph 24.

3.1.4 The requirements for a sequential assessment are set out within the Planning Practice Guide, which sets out what is deemed to be a "town centre" and what is deemed to be "edge of town centre". A town centre is defined as the primary shopping area and areas of predominantly leisure, business and other main town centre uses within or adjacent to the primary shopping area. Edge of centre locations are defined as the area within 300 metres of the town centre boundary for non-retail town centre uses such as leisure.

3.2 The Development Plan

3.2.1 The adopted Proposals Map, which reflects the policies of the development plan and any allocations or designations contained therein, defines the extent of Dover Town Centre.

Core Strategy (2010)

3.2.2 The adopted Dover Core Strategy sets out a spatial strategy for growth and identifies Dover as the major focus for development in the district. One of the district objectives is to ensure that the Strategy's infrastructure needs are identified and that required infrastructure is provided at the right time.

3.2.3 **Core Policy 6** states that in determining infrastructure requirements applicants and infrastructure providers should first consider if existing infrastructure can be used more efficiently, or whether demand can be reduced through promoting behavioural change, before proposing increased capacity through extending or providing new infrastructure.

3.2.4 The Core Strategy notes that the Dover Leisure Centre is becoming outdated (Para 2.55).

Land Allocations Local Plan (2015)

3.2.5 The Land Allocations Plan was adopted in January 2015 and identifies and allocates specific sites that are suitable for development in order to meet the Core Strategy's requirements and in doing so make a major contribution to delivering the Strategy.

3.2.6 The plan identifies Dover Leisure Centre as an 'Area of Change' and states that the focus for the area is to 'create and restore'. It notes that "*given that the existing building is near the end of its useful life, an opportunity exists to create a landmark building. Leisure facilities could be located at a different site, so long as it equally accessible to residents*" (Para 3.144).

3.2.7 The broad objectives set out by the plan are to investigate whether it will be possible to meet the need for modern, inclusive sport and recreation facilities by building new facilities on the existing site, or whether the Leisure Centre should be relocated and the site re-developed; and to ensure that any new development on the site fulfils the potential of this prominent location.

Local Plan Saved Policies (2002)

3.2.8 **Policy OS6** (Indoor sports and recreational facilities) states that proposals for indoor and recreational facilities will be permitted provided that any major new facility is located in Dover or Deal, at a site within the town centre, or if no such site is available, located on the edge-of-centre with good pedestrian and cycle links to the centre, or if no such site is available, is located elsewhere in the urban area on a site which is or can be made accessible by a range of transport modes, including public transport.

4 Sequential Assessment Methodology

4.1 Identified Search Area

4.1.1 The existing Dover Leisure Centre is situated within the urban built confines of Dover but outside of the Town Centre area as defined in the development plan. In terms of sequential assessment, the nearest centre is therefore Dover Town Centre within the local authority area of Dover District Council. Given the proposals relate to the replacement of Dover Leisure Centre, it is not necessary to consider any other town centres in the District and there are no other types of centre within the urban area defined in the development plan.

4.1.2 The NPPF and the National Planning Practice Guidance require a sequential assessment to first look at all potential sites in centres, before assessing edge of centre options. We have therefore assessed sites within the defined boundaries of Dover Town Centre and thereafter any sites that may fall to be considered as being located of the edge of this centre according to the National Planning Practice Guidance, i.e. within 300m of the defined town centre.

4.1.3 To ensure the sequential test is as robust as possible, the standard methodology has been adapted to reflect the particular circumstances of this development. As such, the assessment forms two distinct parts; firstly, the requirements of the NPPF are met in considering potential town centre and edge of centre sites. This is all that a sequential test is required to include. Separate to this, the assessment has been expanded to consider other potential sites in the urban area that do not fall within the town centre or an edge of centre location to inform the wider assessment of alternatives when undertaking the planning balance. This later part of the assessment does not comprise part of the formal Sequential Test Assessment.

4.1.4 Following pre application discussions with Dover District Council it has been agreed that the wider Dover urban area should be considered in line with the Land Allocations Local Plan (2015), which notes that the new leisure facilities could be located at a different non-centre or edge of centre site, so long as it equally accessible to residents. This expanded assessment methodology will therefore assist in informing the wider planning consideration and balance, albeit not necessarily including sites that are sequentially preferable in NPPF terms.

4.2 Parameters

Scale and Format

4.2.1 For the purpose of the Sequential Test, the proposed facility mix has been reviewed to consider what can reasonably be considered as the minimum required level and mix of provision. The Council have undertaken an in-depth feasibility study which has identified Option 4 as best meeting evidenced need having regard to the existing leisure centre provision to be replaced and this has since been refined further with the benefit of more detailed analysis. Having reviewed this feasibility and the current draft proposed facility mix, the findings are considered robust and unless a site is capable of delivering facilities that meet evidenced needs, there cannot be considered any reasonable prospect that the Council would commit the significant financial resources involved in delivering a new leisure centre, notwithstanding its civic responsibilities more generally in meeting the needs of its residents.

4.2.2 Whilst the 2015 feasibility study option states that there is a need for approximately 250 parking spaces and subsequent work has identified a need for more, for the purposes of this sequential test, parking will be considered in accordance with the adopted parking standards for this types of development on a site specific basis, where other considerations indicate that further assessment is warranted. It is, for example, recognised that imposing a 250+ parking space requirement on a town centre site would be unreasonable in the context of this assessment, particularly when considering the current level of provision at the existing leisure centre site.

4.2.3 The 2015 feasibility study included a design feasibility that established minimum building footprints and site areas to accommodate each of the options considered, with either surface parking or decked parking. The Option 4 facilities mix requires a site area of 12,560m^2 if surface parking for 250 cars is assumed. The current draft proposals, through developing designs for the earmarked site, have identified a site area requirement in the region of 2 hectares (again assuming surface parking, but for 340 spaces). Notwithstanding this exercise and has already been identified, the provision of 250+ parking spaces is not considered a realistic requirement in the context of a town centre or edge of centre site. For the purposes of identifying a minimum site area to aid site assessment, the existing leisure centre site provides a useful benchmark. Although strictly edge of centre, the site directly adjoins the town centre and the many public car parks that are found there. Furthermore, the feasibility study shows that the Option 4 footprint can be accommodated on site (albeit being tight). The existing site measures 0.84 hectares and therefore to incorporate a reasonable degree of flexibility, it is considered that a minimum site area of 0.8 hectares provides a reasonable threshold for site assessment purposes.

4.2.4 This site area does not include an allowance for, or ability to accommodate, the outdoor 5-a-side pitches now proposed as an important part of the mix. This is considered in more detail below at 4.2.8 but in order to demonstrate a reasonable level of flexibility in the approach, is considered robust. Notwithstanding that, where a site is of a size where this provision is clearly precluded, this is taken into consideration when considering suitability in the wider sense. This approach ensures more sites are given due consideration than would otherwise be the case, again ensuring robustness.

4.2.5 It should be noted that the actual requirement for parking and landscaping space will vary according to the circumstances of each site, and so in some cases a smaller site may not provide sufficient space. It is also necessary to consider parking provision on a site by site basis given the variations in adopted parking standards by location. If adequate surface level parking is available close by, a smaller site with a reduced number of parking spaces could be considered viable where a site is readily accessible by public transport. A 0.8ha minimum site area is considered robust to include this flexibility, as the existing leisure centre site aptly demonstrates, albeit any site close to this area and meeting the three tests of availability, suitability and viability is likely to require more detailed suitability assessment to properly ascertain if the minimum level of development could be appropriately accommodated..

Scope for Disaggregation

4.2.6 The Practice Guidance requires developers to consider disaggregating specific parts of the leisure development onto separate sites, although it recognises that authorities should not seek arbitrary sub-division of proposals. In the case of the leisure facilities, it is a multiple use, which could be physically and theoretically be split into constituent parts and so the realistic and practical scope for this requires further consideration.

4.2.7 Disaggregation of the core facilities is deemed unreasonable as it would not be practical or viable and sit counter to the leisure centre model and need to replace the existing facility which follows the traditional leisure centre format. The key intention of the proposed new leisure facilities is as a baseline to provide like for like facilities to those existing, but to also provide further facilities to meet the identified needs of the district.

4.2.8 Where disaggregation can reasonably be considered is in respect of the proposed external facilities, namely the synthetic 3G pitches. It is not uncommon that multi-use 3G facilities are provided as standalone development, or linked to schools or sports club. In this case however, the provision currently proposed is more bespoke and limited to 5-a-side use for only 2 pitches (compared to a standard/full sized 3G pitch which would usually allow subdivision to form 4 smaller 5-a-side pitches. As such, this form of provision is less likely to be viable and therefore deliverable as a standalone facility. For this reason and given that it forms an integral component of the current draft mix in the context of identified supply and need, The ability for a site to deliver this facility alongside the leisure centre is considered material. Notwithstanding this and for the reasons outlined in 4.2.4, for the purposes of undertaking an initial site sieving exercise based on size, it is considered more appropriate to exclude this from the minimum site area as any sequentially preferable site that meets all other requirements with the exception of that would reasonably require careful consideration.

4.2.9 Furthermore, in the context of a town centre sequential test assessment, the provision of an external 3G pitch in town centre locations is considered out of character and unreasonably land-hungry 9albeit less so for the model envisaged). Accordingly, for the purposes of this assessment, a 3G pitch has not been included in determining the minimum site area and similarly, was not included in the 2015 design feasibility that considered minimum site areas.

Other Considerations

4.2.10 In addition, the leisure centre is considered to require the following:

- Easy access to the road network and public transport links – a leisure centre must be accessible to users by a range of means. This is particularly relevant given the references to accessibility in the development plan. Advice has been sought from DHA Transport where required in respect of accessibility, parking and other related highway matters.

- Prominence – given the civic nature of the use and the status of the facility as the key sports facility in Dover, it is considered necessary for the building to have a reasonable degree of prominence or favourable location strategically, which in itself can also assist with wayfinding and legibility for users.

4.2.11 These factors have been taken into consideration in assessing potential sites. The sequential assessment of the site is set out on the following pages and broken down into town centre and edge of centre sites, followed by further assessment of non-centre urban sites as part of this report's wider remit.

4.3 Site Identification

4.3.1 Having established the parameters for the site requirements, and the degree of flexibility in provision and scale, it is necessary to identify individual sites in the town centre and edge of centre for detailed assessment.

4.3.2 In this regard, site identification has been undertaken in a methodical, multi-method manner in order to comprehensively search the relevant areas for sites that should be considered and ensuring that no potential sites go unassessed. This work was primarily undertaken in April and May 2016.

4.3.3 Firstly, a review of the sites identified within the 'Feasibility and Options Appraisal Study for Dover Leisure Centre', December 2015 was undertaken. The Sports Consultancy, in partnership with GT Architects, Faithful+Gould and Hadron Consulting, was appointed by Dover District Council in July 2015 to complete a feasibility and options appraisal study for the improvement and replacement of the existing Dover Leisure Centre. The process involved a detailed evaluation of some potential alternative sites in broad alignment with the requirements of a sequential test (albeit not all were town centre or edge of centre). Whilst the original feasibility work was extensive, the study provided the foundations for a further comprehensive independent site search to be conducted.

4.3.4 Secondly, a desk-based search using the local authority online planning database was undertaken to identify all sites allocated for development within the Development Plan, and/or with planning permission for a *leisure use/ leisure centre* or similar development. Where this was lacking, the planning department was contacted by telephone to identify any relevant past permissions, which was necessary given the absence of a map-based search facility on the Council's online database. The Council's Strategic Housing Land Availability Assessment (SHLAA) was also examined. Whilst this considers sites in relation to residential development opportunities, it offers a useful indication of the potential availability of sites.

4.3.5 Thirdly, the Proposals Map was examined to identify any sites with site-specific policy designations that may offer potential for leisure developments, even if not explicitly identified as a potential use in the policy.

4.3.6 Fourthly, local listings form land and other agents were reviewed to identify the sites currently being marketed, either specifically for leisure use or generally and unspecified development potential. Agents would be contacted directly where required to obtain more detailed information on sites.

4.3.7 Fifthly, the Dover urban area was visited and explored on foot and by car to identify any sites either being actively marketed on the ground which may have been missed during local listings search, or which in the opinion of DHA Planning, may have the potential for redevelopment either by virtue of being presently vacant or being physically well suited to a development of the nature proposed.

4.3.8 The area of search was defined using the Proposals Map, which plots the town centre boundary for the centre. This boundary was also plotted on Google Earth base aerial photograph in order to accurately define the 'edge of centre' zone for the identified centre. Here, the distance from the centre could be measured and calculated using the integrated Google Earth measuring tool to establish the geographical extent of 'edge of centre', being 300 metres in accordance with the National Planning Practice Guidance definition of 'edge of centre'.

Figure 4.1: Dover Town Centre (edged red) – Image courtesy of Google Earth

4.4 Site Assessment

4.4.1 Each site identified in accordance with the methodology set out at 4.3 was subsequently assessed individually in accordance with the National Planning Practice Guidance.

4.4.2 In this regard, each site was assessed on the basis of its suitability, availability and viability.

Suitability

4.4.3 Each site identified via the means outlined above has been visited in order to consider its potential to accommodate the proposed development, having regard to the identified site requirements in terms of scale, accessibility and locational context (e.g. neighbouring uses may make a site that was otherwise suitable unsuitable). Based on this, a judgement has been made on whether the site is suitable for the proposed leisure use, and if so, whether it is suitable for a leisure centre of the type and scale proposed.

4.4.4 In determining suitability, it is also necessary to consider the prospects of securing the necessary consents for the proposed development. This process is informed via planning history research of each site to determine what has previously been granted or refused and why, and a review of any relevant planning policy or designations which would be material to any planning application. This is therefore a professional planning judgement. Further specialist advice on highway related matters where appropriate.

4.4.5 In making a qualitative judgement on suitability, and as set out within the National Practice Guidance, it is also necessary to consider the nature of the scheme, the attractiveness of linkages, and the way in which the scheme will operate as an integral part of the centre. As there are subjective judgments involved in some aspects of suitability, it is necessary in the interest of robustness, to log all such comments in the assessment matrix.

Availability

4.4.6 Where a site is being actively marketed, its availability is clear. Where this is not the case and enquiries made do not yield a definitive answer, an educated judgement is made based upon the facts. For example, if a site has been subject to recent planning applications for a certain use but no operator has been named or development commenced, there is a likelihood that the site owners would be open to redevelopment. Conversely, where there is no such indication available and a site is clearly in multiple ownerships, it can be deduced that site assembly and therefore availability are likely to prove problematic. Where a site is identified as both suitable and viable, further more concrete enquiries to determine availability are made, given that this then becomes the decisive factor in the assessment.

4.4.7 It is also important to consider the nature of any availability and whether a site is available on a freehold or leasehold basis, and also if deemed unavailable, whether there is any prospect of the site becoming available in the near future.

Viability

4.4.8 Viability of a site, as the National Planning Practice Guidance confirms, rests with market factors (including potential alternative uses, adjacent uses, level of demand etc) cost factors (including any exceptional site or planning costs), and delivery factors (phasing considerations, site ownership issues, s106 requirements etc). These by their nature require detailed financial and market assessment on a site basis and are therefore only considered where a site is deemed both suitable and available, and where this level of assessment thus becomes necessary.

4.4.9 The following sections considers those sites identified following the methodology described above, grouped into town centre sites (the most sequentially preferable), edge of centre sites (next most preferable sequentially) and other urban sites. It is important to note that the other urban sites considered do not strictly form part of the sequential test assessment, but instead a wider assessment that reflects the policy context which applies in this case.

5 Site Assessment – Town Centre

5.1 St James

5.1.1 This is an identified development site in the Local Plan under Saved Policy AS9. The saved policy allocates the site for a mixed use scheme including B1 employment, retail, residential, leisure and tourism uses. This allocation is reinforced and reiterated within the adopted Land Allocations Local Plan (2015 – page 46). The extent of the allocated site as shown at Figure 5.1, includes the existing leisure centre site.

5.1.2 The large majority of the site (i.e. excluding the existing leisure centre site) has secured planning permission for a mixed retail and leisure-led development and is currently under construction. As part of this approved and implemented scheme, there is no inclusion or provision of a leisure centre, with the majority of alternative space on site taken or under offer (source: www.stjamesdover.co.uk).

5.1.3 Therefore although the wider allocated site is suitable in size and location, it is not available and requires no further assessment or consideration. The existing leisure centre site is considered separately below as an edge of centre site.

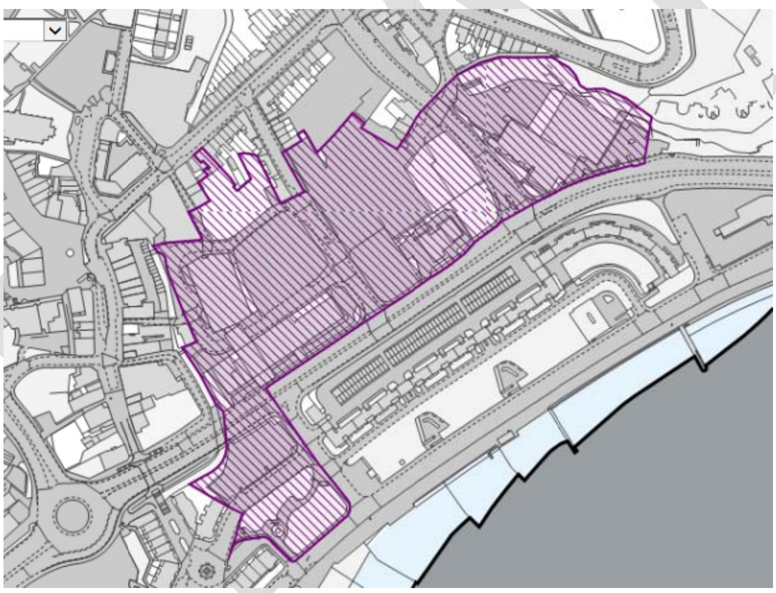


Figure 5.1: Proposals Map Extract – Policy AS9, St James Allocation

Figure 5.2: St James development Location Plan – courtesy of www.stjamesdover.co.uk

Figure 5.3: St James development Layout Plan – courtesy of www.stjamesdover.co.uk

5.2 Dover Waterfront (South of A20)

5.2.1 This site is an identified development site in the adopted Core Strategy under Policy CP8 *"for a mixed use scheme including retail (A1 uses up to 20,000 square metres floorspace), restaurants, cafés and drinking establishments (A3 and A4 uses up to 7,000 square metres), assembly and leisure (D2 uses up to 15,000 square metres), residential (C3 use of at least 300 homes), offices (B1) and hotel (C1) uses"*. Given this allocation, a mixed use development at the site could in principle accommodate leisure uses in the form of a leisure centre. For the purposes of this site assessment, the Waterfront allocation south of the A20 has been assessed separately from the land north of the A20 at Bench Street (see below).

5.2.2 The site is by its nature constrained physically by the central marina, which does not provide any clearly developable and contiguous parcels of land. Large spaces which do exist, such as the car park to the north west of the marina is still of insufficient size (c.0.5 hectares) and awkward in its linear configuration. Any development of this part, it is assumed, would be dependent upon relocation of the Marina, planned as part of the Western Docks Revival, making delivery within a reasonable timescale almost certainly not possible. Whilst the policy refers to some potential infilling of the doc to help facilitate development, this would represent an additional, and likely not insignificant, extraordinary cost of development.

5.2.3 Other available parts of the site comprise small parcels and are not suitable (such as those advertised on site off Cambridge Crescent) for the development sought, instead comprising largely refurbishment opportunities. It is also noted that Policy CP8 seeks a coordinated masterplan approach and comprehensive site-wide proposals.

5.2.4 The Port of Dover have been contacted (twice) to enquire about availability and their wider development plans but a response still awaited. In any event, it has been shown that no suitable opportunity exists on site., notwithstanding the allocation.

Figure 5.4: Proposals Map Extract – Policy CP8, Dover Waterfront Allocation

5.1 Dover Waterfront (North of A20 – Land at Bench Street)

5.1.1 This land, as referred to at 5.2 above, forms part of the identified development site in Core Strategy Policy CP8 (part of Waterfront allocation). As such, a mixed-use development would in principle be able to suitably accommodate leisure uses and remain in accordance with Policy.

5.1.2 The site lies immediately north of the A20 and includes vacant/derelict buildings on a prominent frontage and approach into the town. The remainder of site is predominantly occupied and in active A1/A3/A4/A5 uses. As such, the currently available land is insufficient in size. It is assumed that the land is in multiple ownerships, but lack of suitability (size) doesn't warrant further investigation.

5.1.3 The site is currently constrained by the existing underpass leading to the Waterfront to the south, which it is assumed would be replaced by an overground link as part of any comprehensive redevelopment, as sought by the allocation policy. This could help remove what might otherwise be a physical constraint to development, but the policy does refer to The policy also states that "It may also be appropriate to include a foreground building on the northern side of the A20", with reference to the important views towards a landmark building to the south, which the policy seeks. It is considered unlikely that a building of the scale and mass required to accommodate the leisure centre would satisfy this policy objective.

5.1.4 Given the above, whilst the overall land allocated as part of Policy CP8 north of the A20 appears to be sufficient in size, the immediately available land is not and it is considered unlikely that a development of the nature sought and required would satisfy the design criteria of the allocation policy. Further information regarding land ownership and anticipated timescales for masterplan development would assist in further assessing the site, but based on the information available the site would not appear immediately available or suitable.

Figure 5.5: Proposals Map Extract – Policy CP8, Dover Waterfront Allocation

5.2 Maison Dieu

5.2.1 This site forms part of the Dover Mid Town allocation set out in Core Strategy Policy CP9. This policy allocates the site for mixed use development of C2 uses (residential institutions), C3 uses (residential of at least 100 homes), A1 shop uses, A3 restaurants and cafés uses and A4 Drinking establishments uses (of up to 15,000 square metres), D1 (non-residential institutions), the redevelopment of South Kent College (around 5,000 square metres), and parking to serve the development and the town centre. Whilst D2 leisure uses are not listed, it is considered reasonable to assume that as a defined main town centre use, and in the context of the existing character of public and civic uses, there would be no in-principle objection, albeit the exclusion of this use is notable by contrast to other town centre allocations where this use is specified.

5.2.2 The policy preamble confirms that the site is defined in a broad way to enable a comprehensive view of its future to be taken and that this does not imply that all buildings within it are proposed for redevelopment. In reviewing the land within the allocation, the only parcels deemed to have a reasonable possibility of being available and suitable in size is the surface car park outlined in blue at Figure 5.7 below. In considering this, it was considered prudent to also consider the adjoining health centre for completeness.

5.2.3 As the aerial photograph shows, the site is primarily existing car park, partly designated for Health Centre use. The Council's Parking Strategy (Draft 2007) shows relatively low occupancy and low quality scoring and so scope for redevelopment (consistent with Local Plan) in principle is considered likely to exist. It is though noted that Dover is shown to be poorly served relative to retail floorspace compared to competing centres and the strategy assumes reprovision as part of any redevelopment..

5.2.4 The car park falls slightly under 0.8Ha in size. It was considered as part of the original feasibility, which shows the site to be very constrained to accommodate Option 4. It would also not allow for 3G 5-a-side provision as per the current proposals.

5.2.5 The NHS have been contacted regarding availability in any event (to see if the Health Centre site is likely to be available in the near future or not and to understand availability of their parking area). The NHS in response have confirmed that the site is not available. Notwithstanding this if any redevelopment ever were to come forward in the foreseeable future, it would need to include reprovision of the clinical facility. The site is self-evidently not big enough to deliver this, reprovide parking and the leisure centre and as such no further assessment is necessary.

Figure 5.6: Proposals Map Extract – Policy CP9, Dover Mid Town Allocation

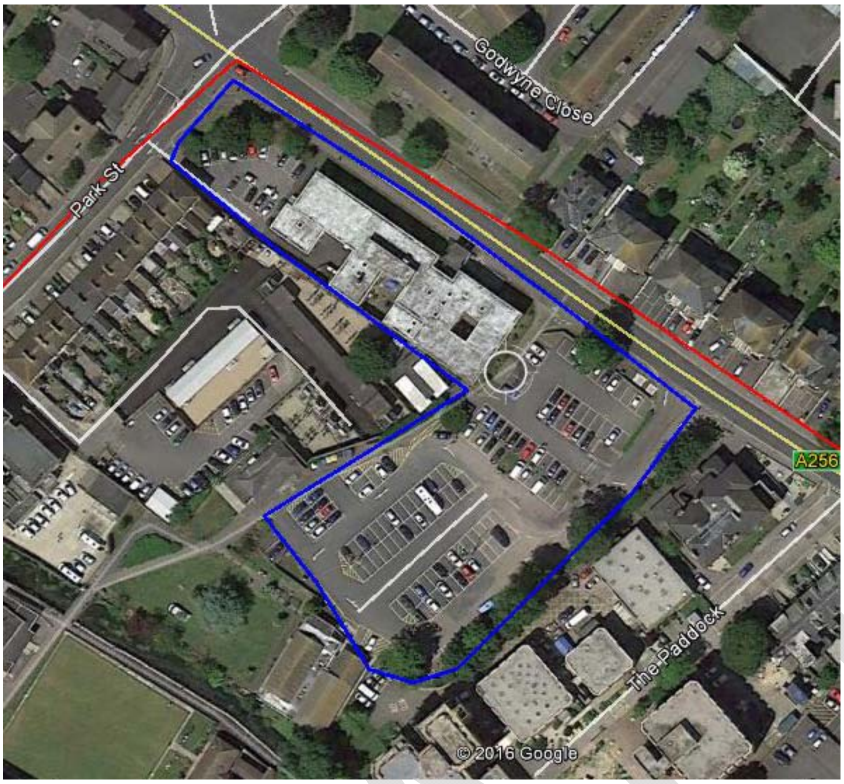


Figure 5.7: Maison Dieu Car Park & Health Centre (edged blue) – Image courtesy of Google Earth

6 Site Assessment – Edge of Centre

6.1 Dover Leisure Centre

6.1.1 The 2015 feasibility considers refurbishment and concludes this is neither cost-effective nor will it yield the quality of provision sought. In any event, it is likely to be highly disruptive to ongoing provision, even if it were possible to maintain some degree of public access during that period, which is deemed doubtful.

6.1.2 Redevelopment is not a suitable option as it would require a lengthy break in service provision of approximately 18 months. Discussions with the Council have confirmed that such a scenario will not be entertained in the interests of local leisure facility provision, and given the site's role as the principal indoor leisure facility at the District's largest and principal settlement, that is considered a reasonable position and one supported in planning terms through the need to deliver sustainable development. This is therefore considered a reasonable and highly relevant consideration in respect of suitability.

6.1.3 Although the Option 4 footprint can just be accommodated on site (as the 2015 feasibility shows), the site is not suitable due to the need for ongoing service provision. It would also not allow provision of 3G 5-a-side pitches as per the current proposals.

Figure 6.1: Proposals Map Extract – Policy AS9, part of St James Allocation

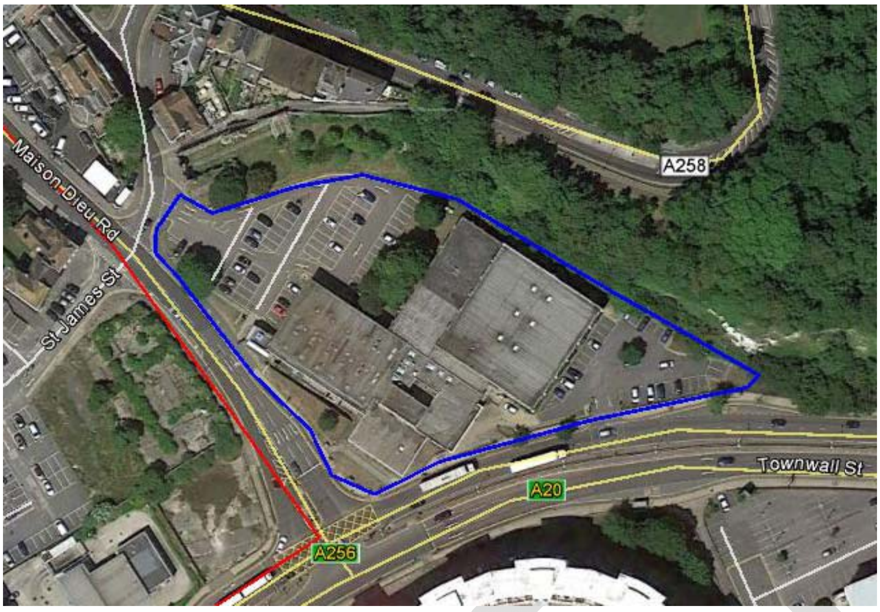


Figure 6.2: Dover Leisure Centre (edged blue) – image courtesy of Google Earth

6.2 Albany Car Park

6.2.1 This is an identified development site in the Local Plan (Land Allocations Local Plan Policy LA4) and so can reasonably be considered available for development (albeit identified for c. 15 dwellings).

6.2.2 At 0.4ha, the site is too small and therefore not suitable.

6.2.3 The site is also constrained by heritage designations and topography relative to adjacent development.

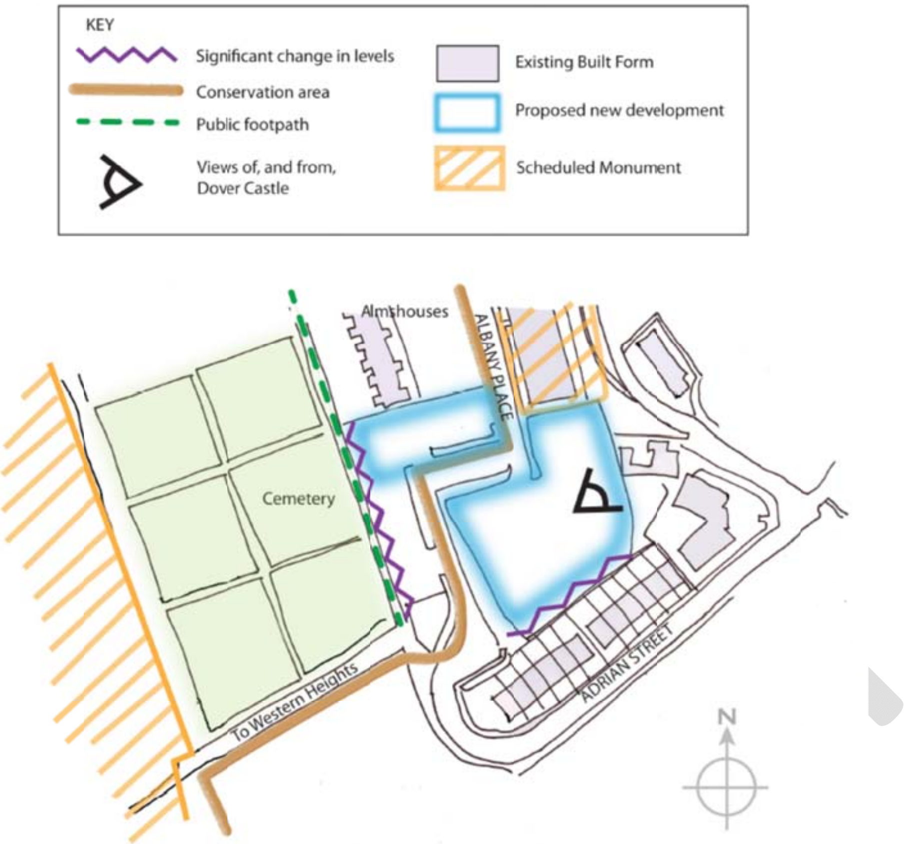


Figure 6.3: Albany Car Park Allocation – extract from Land Allocations Local Plan (2015), Policy LA4

Figure 6.4: Proposals Map Extract – Policy LA4, Albany Car Park Housing Allocation

6.3 Former Charlton Sorting Office

6.3.1 This is an identified development site in the Local Plan (Land Allocations Local Plan Policy LA3) and so can reasonably be considered available for development (albeit identified for c. 15 dwellings).

6.3.2 A previous planning application for residential development was withdrawn and the site is now being actively marketed and so is confirmed as available.

6.3.3 At 0.68ha the site is too small to accommodate the development, a position exacerbated by its linear configuration given that the leisure centre requires a more square form. Given this, the site is not suitable and further direct enquires regarding availability are not necessary.

Figure 6.5 Proposals Map Extract – Policy LA3, Former Charlton Sorting Office Housing Allocation

7 Site Assessment - Other Urban Sites

The following sites are neither town centre nor edge of centre and do not therefore form part of the sequential test assessment as required by policy (i.e. in policy terms are no more sequentially preferable than the identified White Cliffs Business Park site), but are included for completeness. For ease of comparison, the proposed White Cliffs Business Park site is also included and assessed.

7.1 Buckland Mill

7.1.1 The site is identified in the Local Plan for residential development (Land Allocations Local Plan Policy LA9 – 265 dwellings).

7.1.2 Although leisure development does not form part of this development sought by the policy, it is a clear larger scale development opportunity.

7.1.3 The site owners (HCA) have been contacted and have very firmly confirmed that the site would not be available for leisure centre development. It is not therefore available and likely not to be suitable in light of its prescriptive residential allocation.

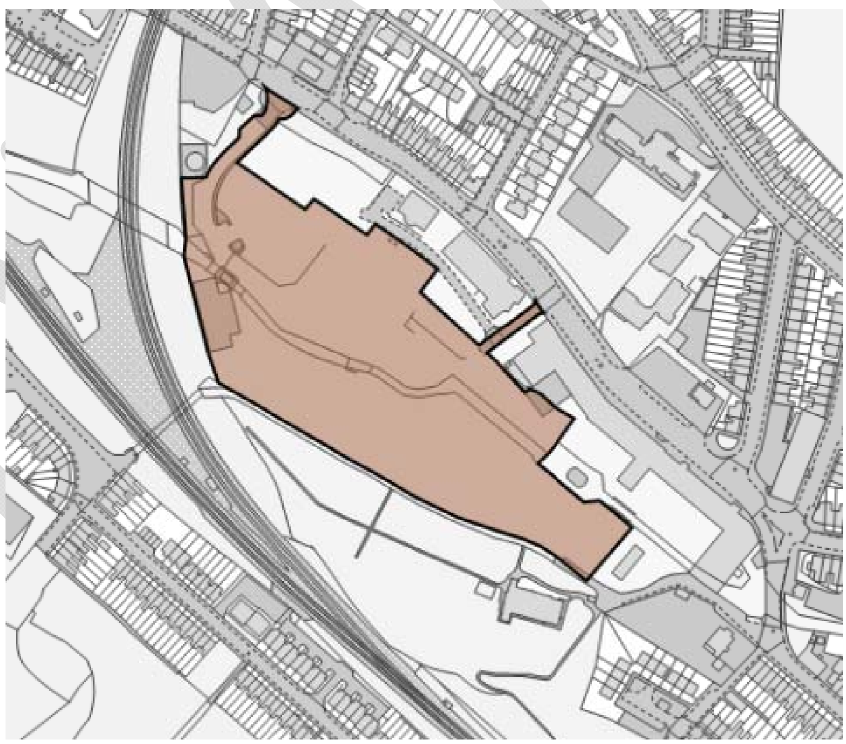


Figure 7.1: Proposals Map Extract – Policy LA9, Buckland Mill Housing Allocation

7.2 Westmount

7.2.1 The site is of sufficient size and well located in relation to the train station.

7.2.2 The site has recently been cleared and buildings demolished with groundworks ongoing. Land Allocations Local Plan Policy LA10 identifies the site as a residential allocation for approximately 100 dwellings.

7.2.3 Residential planning permission was secured for the site in September 2009.

7.2.4 The Churchgate (developer) website confirms that the site is now being developed and is not therefore available and does not warrant any further assessment.

Figure 7.2: Proposals Map Extract – Policy LA10, Westmount Housing Allocation

7.3 Land East End of Coombe Valley Road

7.3.1 Land here is in varying industrial use and so not readily 'available'. It is though identified as part of the wider Coombe Valley development area in the Local Plan under the terms of Land Allocations Local Plan Policy LA8 for an estimated 450 residential dwellings.

7.3.2 Of the land shown in Figure 7.3 below, the most obviously developable site lies adjacent to the gas holder and there are therefore likely to be Health & Safety Executive (HSE) issues to overcome and/or additional costs to development as a result.

7.3.3 The plot to the immediate east of the gasholder measures approximately 0.7ha and is therefore slightly too small to accommodate the minimum required form and amount of development.

7.3.4 Coombe Valley Road represents a secondary urban location, separate from main transport nodes and the main road network, limiting prominence and legibility for potential users. In any event, it was considered relevant for the Coombe Valley potential development sites to be considered in more detail in respect of highway considerations to explore this issue further.

7.3.5 From the A256 London Road, vehicles would turn onto Coombe Valley Road via a signalised junction to access the site. From here vehicles would go under a narrow signalled railway bridge. Both of these restrictions on the network may need to be modelled to identify if they have capacity for any increase in flows as a result of a leisure centre development.

7.3.6 Coombe Valley Road is provided with footways so safe pedestrian access is possible, however, those on foot would need to cross the road after walking under the railway bridge.

7.3.7 Two bus stops are provided on Coombe Valley Road but these are only served by two routes, both operating between Ayecliffe and Whitfield (60 and 60A). A wider range of services are provided on the A256 (60, 60A, 61, 61A, 62, 87, 88, 88A, 89, 89A, 91, 93, 96, 541, 991) some 350m away.

7.3.8 It is anticipated that the site would require a reasonable level of parking to reflect its slightly out of centre location. However, good bus access from London Road may allow for some flexibility.

7.3.9 The sites generally benefit from existing access onto Coombe Valley Road, which is likely to be suitable for the proposed use with slight modifications. Rear access from Prospect Place would not be suitable.

7.3.10 This assessment is considered to be consistent with the view that Coombe Valley comprises a 'secondary' location which would not readily meet the requirements of the development as set out in this report.

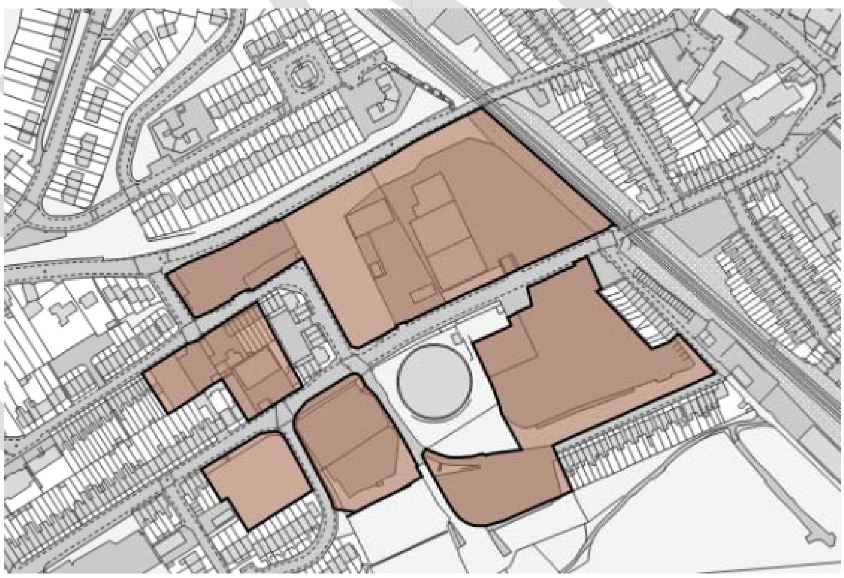


Figure 7.3: Proposals Map Extract – Policy LA8, Coombe Valley Road Housing Allocation (east end)

7.4 Former Buckland Hospital Site

7.4.1 This site, also located on Coombe Valley Road further to the west, is vacant and was recently to be taken to auction. It is understood however from speaking with the site owners KCC, that the site was withdrawn from the recent auction to allow further discussions to take place between them and the NHS to fully explore any potential healthcare related developments. It is understood that in the event those discussions are not concluded positively, it would be put back for auction. Given this, there is some uncertainty over availability at the present time.

7.4.2 The vacant part of the site is large enough to accommodate the minimum amount and form of development required.

7.4.3 None of the existing buildings are understood to be listed, but do provide some non-designated heritage value to consider in the terms set out within the NPPF.

7.4.4 The existing Land Allocation Local Plan refers to residential development here (450 units across Coombe Valley area) with no provision for leisure referenced.

7.4.5 The site is remote from strategic routes, with the same highways assessment applying as set out at 7.3 above, but without the added benefit of proximity to London Road and the additional bus services found there.

7.4.6 Some potential 'civic/community' synergy could be delivered with the adjacent new hospital in terms of character and use, but this would be to the detriment of housing delivery in view of the current allocation and at secondary location away from main roads and routes. It is not therefore considered suitable, whilst availability remains uncertain.

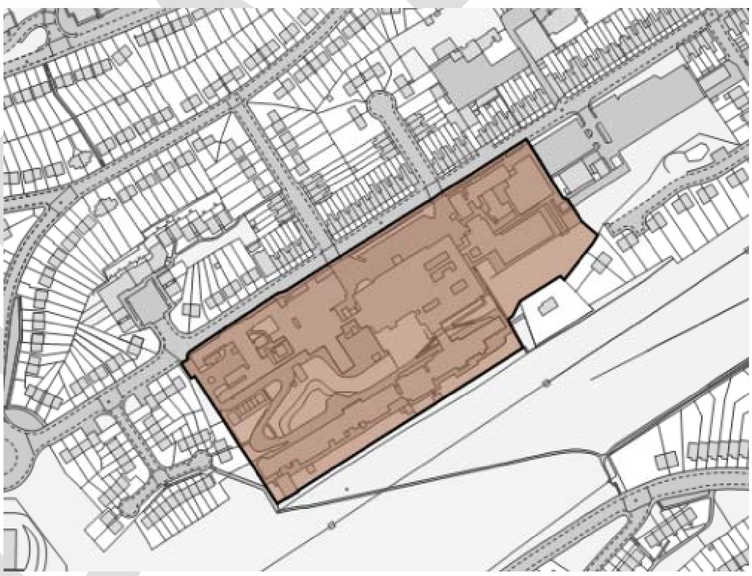


Figure 7.4: Proposals Map Extract – Policy LA8, Coombe Valley Road Housing Allocation (Former Buckland Hospital)

7.5 Land at Western End of Coombe Valley Road

7.5.1 This land also forms part of the wider Coombe Valley allocation (Policy LA8) and is sited even further from the town centre and main urban area than the Buckland Hospital site considered above. This is considered to be very much a secondary location with no prominence and added potential implications in respect of landscape impact on the AONB, a highly material planning consideration to any development where that applies.

7.5.2 The land is a former industrial development and use meaning there are possible implications for construction/decontamination costs.

7.5.3 In highway terms, the site is even more remote from strategic routes than noted above at 7.4. For the same but even more applicable reasons as outlined at 7.4, the site is not considered suitable and accordingly enquiries regarding availability are not considered necessary.

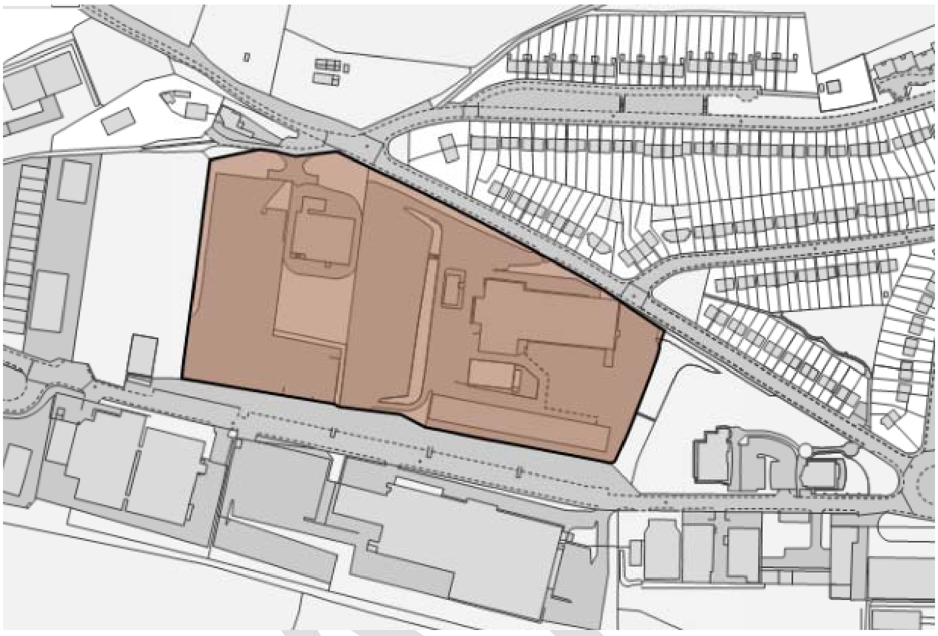


Figure 7.5: Proposals Map Extract – Policy LA8, Coombe Valley Road Housing Allocation (west end)

7.6 TA Centre, London Road

7.6.1 This site is an identified development site in the Land Allocations Local Plan under Policy LA7 for approximately 10 dwellings.

7.6.2 At 0.33 hectares the site is too small and not therefore suitable, with no further assessment required.

Figure 7.6: Proposals Map Extract – Policy LA7, TA Centre, London Road Housing Allocation

7.7 Former Melbourne Community Primary School

7.7.1 This site is known to have previously been available (it was promoted by DHA through the Council's SHLAA) but not taken forward for allocation and is now occupied by KCC (Thistley Hill). It is therefore not available and has previously been deemed unsuitable for inclusion in the SHLAA. The site is part allocated for residential development, but that allocation site is not big enough (and in any event for residential development and not leisure use).

7.7.2 The site occupies a secondary location and access onto the highway network and in view of this and the above is neither suitable nor available.

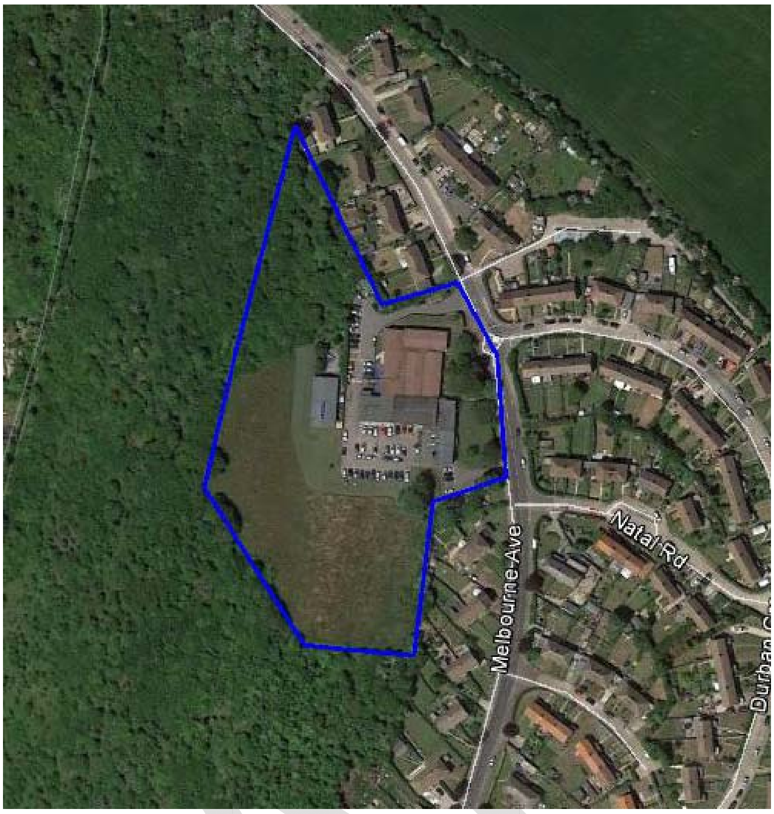


Figure 7.7: Former Melbourne Community Primary School (edged blue) – Image courtesy of Google Earth

7.8 White Cliffs Business Park, Whitfield – 'Triangle Site'

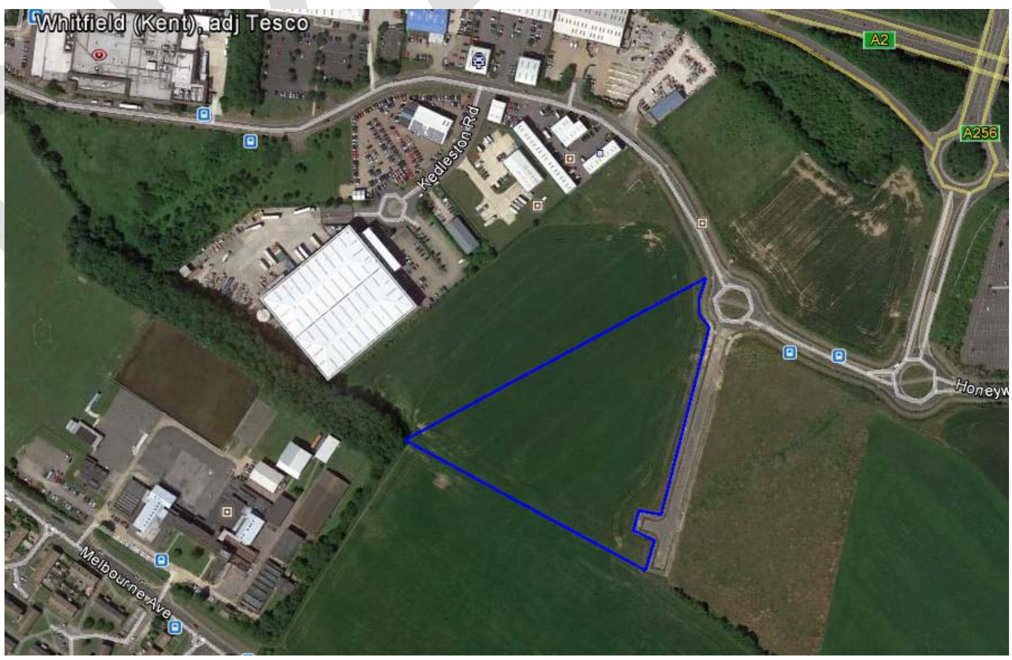


Figure 7.8: Land at White Cliffs Business Park, Whitfield (edged blue) – Image courtesy of Google Earth

7.8.1 This site falls within the urban area as defined on the Proposals Map, being part of the White Cliffs Business Park employment allocation at Whitfield. In that respect, the principle of development at this site is broadly accepted by policy, although the allocation for an alternative use would need addressing in any planning application.

7.8.2 Design feasibility work has shown the site to be large enough to accommodate the proposed development and it exceeds the minimum 0.8 hectare sieving threshold. Further work would be required on the feasibility of development specifics (and the viability implications of these) such as drainage and services, although assessments instructed by the Council to date have indicated that the site is developable.

7.8.3 In highway terms, the site is afforded good vehicle access to the A2 and A256, however, it is not necessarily located in a highly sustainable location.

7.8.4 The site is served by a number of bus services (12, 60, 60A, 61, 61A and 89) providing links to Canterbury, Deal and Whitfield generally at a minimum of one bus per hour. It is also understood that a Bus Rapid Transport system is proposed within the area, which will improve accessibility.

7.8.5 Pedestrian access would be limited to those living in the small residential area close to the site, however, new good quality lit footways are provided.

7.8.6 It is anticipated that the site would require high levels of parking to reflect its out of centre location.

7.8.7 The site would require a new access on to Honeywood Parkway, which would need to be designed to the current standards and be subject to a Road Safety Audit.

7.8.8 The Council have held constructive discussions with the site owner and it can therefore be regarded as available.

7.9 Land Adjacent to Dover Christchurch Academy

Figure 7.9: Land adjacent to Dover Christchurch Academy (edged blue) – Image courtesy of Google Earth

7.9.1 This site sits entirely outside the settlement boundary and is therefore greenfield, unallocated land. There is no direct policy support for such development and as such exceptional justification would be required as part of the wider planning case presented.

7.9.2 In pure physical terms, the site is of sufficient size to accommodate the development, although considerable work would be required on the feasibility of development specifics (and the viability implications of these) such as drainage and services.

7.9.3 In accessibility and highway terms, broadly speaking the same applies to this site as set out above for the adjacent White Cliffs Business Park site, although it is noted that pedestrian accessibility from the urban area to the south may be achievable, whilst the site is lightly more remote and detached from the existing road network and public transport network.

7.9.4 The site is not known to be unavailable and it is understood that some enquiries were made by the Council with the landowner that would support this position, albeit those discussions were not conclusive.

8 Summary & Conclusions

8.1 Summary

8.1.1 Dover District Council are pursuing plans for a replacement to Dover Leisure centre, which comprises a 'Main Town Centre Use' as defined within the NPPF. Accordingly, and as directed by policy, a Sequential Test Assessment is required in the event that an out of centre site is proposed. This assessment fulfils that requirement and follows the available and applicable guidance, given that the Council have identified an out of centre site at White Cliffs Business Park, Whitfield as the preferred site.

8.1.2 This report offers an independent assessment of potential alternative sites having regard to suitability and availability for the proposed development, the minimum requirements of which have been informed by thorough and well-reasoned feasibility work carried out in 2015.

8.1.3 The assessment has drawn upon a range of evidence and methods to identify and assess potential sites. It is intended to inform the Council's ongoing review and decision-making process in the delivery of a new leisure centre and should be subject to ongoing review as and when any new evidence becomes available (such as the results of the recent Brownfield Call for Sites) or new sites identified or suggested. This ongoing review should continue up to the point of planning application submission, if pursued, to ensure a robust document is presented as part of any application that both informs the proposals and informs the local planning authority's determination of the application.

8.2 Conclusions

Sequential Test

8.2.1 No site located within the town centre has been identified to date that can reasonably be considered available, suitable and viable for the proposed leisure centre development, even when allowing for some disaggregation of facility in the form of the proposed 3G 5-a-side football pitches.

8.2.2 No site located in an edge of centre location, as defined by policy (within 300m of the defined town centre), has been identified to date that can reasonably be considered available, suitable and viable for the proposed leisure centre development, even when allowing for some disaggregation of facility in the form of the proposed 3G 5-a-side football pitches.

8.2.3 Accordingly, it is considered that the proposals at Whitfield satisfy the sequential test as set out within and required by the NPPF.

Wider Assessment

8.2.4 Separate from the sequential test, other potential sites in the wider urban area have been considered in the interests of informing the overall planning balance and consideration, particularly in light of the Land Allocations Local Plan stating that *"given that the existing building is near the end of its useful life, an opportunity exists to create a landmark building. Leisure facilities could be located at a different site, so long as it equally accessible to residents"* (Para 3.144).

8.2.5 Other sites suitable in size have been identified at Buckland Mill and Coombe Valley Road, however these are all allocated for housing. In contrast, the currently favoured site by the Council as facility provider is allocated for employment, which although not strictly consistent with a leisure use, does still offer employment. Buckland Mill is confirmed by the site owners as unavailable.

8.2.6 In locational terms, the potentially available and suitable sites (Coombe Valley Road and Whitfield) are not currently highly accessible by public transport, although the Local Plan does make direct future provision for improved bus services at Whitfield and it provides a more strategically advantageous and prominent location.

8.2.7 Therefore, in the wider planning sense, owing to the nature of its allocation (relative to Coombe Valle Road) and the greater scope for public transport access, land at White Cliffs Business Park is considered broadly preferable to other identified alternatives in the urban area. It will be for any subsequent planning application to provide the sufficiently detailed planning case for the development, including a thorough assessment of accessibility relative to alternatives and the existing site.

Appendix 7 – Capital Costs

This appendix has been redacted

Appendix 8 – Detailed Revenue Projections

Including Lifecycle Costs

Income

	[redacted]
Dry side	
Health & Fitness	
Wetside	
Other Memberships	
Rentals	
Secondary	
Outdoor	
Total Income	

Expenditure

Staffing costs:	
Permanent staff costs	
Casual staff costs	
Employer NIC Contribution	
Staff training	
Uniforms	
Sub Total	
Premises costs:	
Utilities - electricity	
Utilities - gas	
Utilities - water	
Repairs & maintenance	
Planned maintenance	
Grounds maintenance	
Cleaning and refuse	
Pool chemicals	
Rent/Lease	
Equipment refresh	
H&F equipment leasing	
3G pitch sinking fund	
NNDR	
Lifecycle costs	
Capital costs	
Sub Total	
Management costs:	
Launch marketing and promotion	
Marketing, advertising and promotion	
Insurances	
Print, post and stationery	
Telephone	
Audit and legal	
Licences and subscriptions	
Other administration costs	
Irrecoverable VAT	
Sub Total	
Cost of sales:	
Food and beverage cost of sales	
Retail cost of sales	
Sub Total	
Other costs:	
Central costs	
Profit	
Performance Bond	
Contingency	
Sub Total	
Total Expenditure	
Profit/Loss (Management Fee)	

Excluding Lifecycle Costs

Income

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	10-year average
Dry side	[redacted]										
Health & Fitness											
Wetside											
Other Memberships											
Rentals											
Secondary											
Outdoor											
Total Income											
Expenditure											
Staffing costs:											
Permanent staff costs											
Casual staff costs											
Employer NIC Contribution											
Staff training											
Uniforms											
Sub Total											
Premises costs:											
Utilities - electricity											
Utilities - gas											
Utilities - water											
Repairs & maintenance											
Planned maintenance											
Grounds maintenance											
Cleaning and refuse											
Pool chemicals											
Rent/Lease											
Equipment refresh											
H&F equipment leasing											
3G pitch sinking fund											
NNDR											
Lifecycle costs											
Capital costs											
Sub Total											
Management costs:											
Launch marketing and promotion											
Marketing, advertising and promotion											
Insurances											
Print, post and stationery											
Telephone											
Audit and legal											
Licences and subscriptions											
Other administration costs											
Irrecoverable VAT											
Sub Total											
Cost of sales:											
Food and beverage cost of sales											
Retail cost of sales											
Sub Total											
Other costs:											
Central costs											
Profit											
Performance Bond											
Contingency											
Sub Total											
Total Expenditure											
Profit/Loss (Management Fee)											

Appendix 9 – Sensitivity Analysis

Including Lifecycle Costs

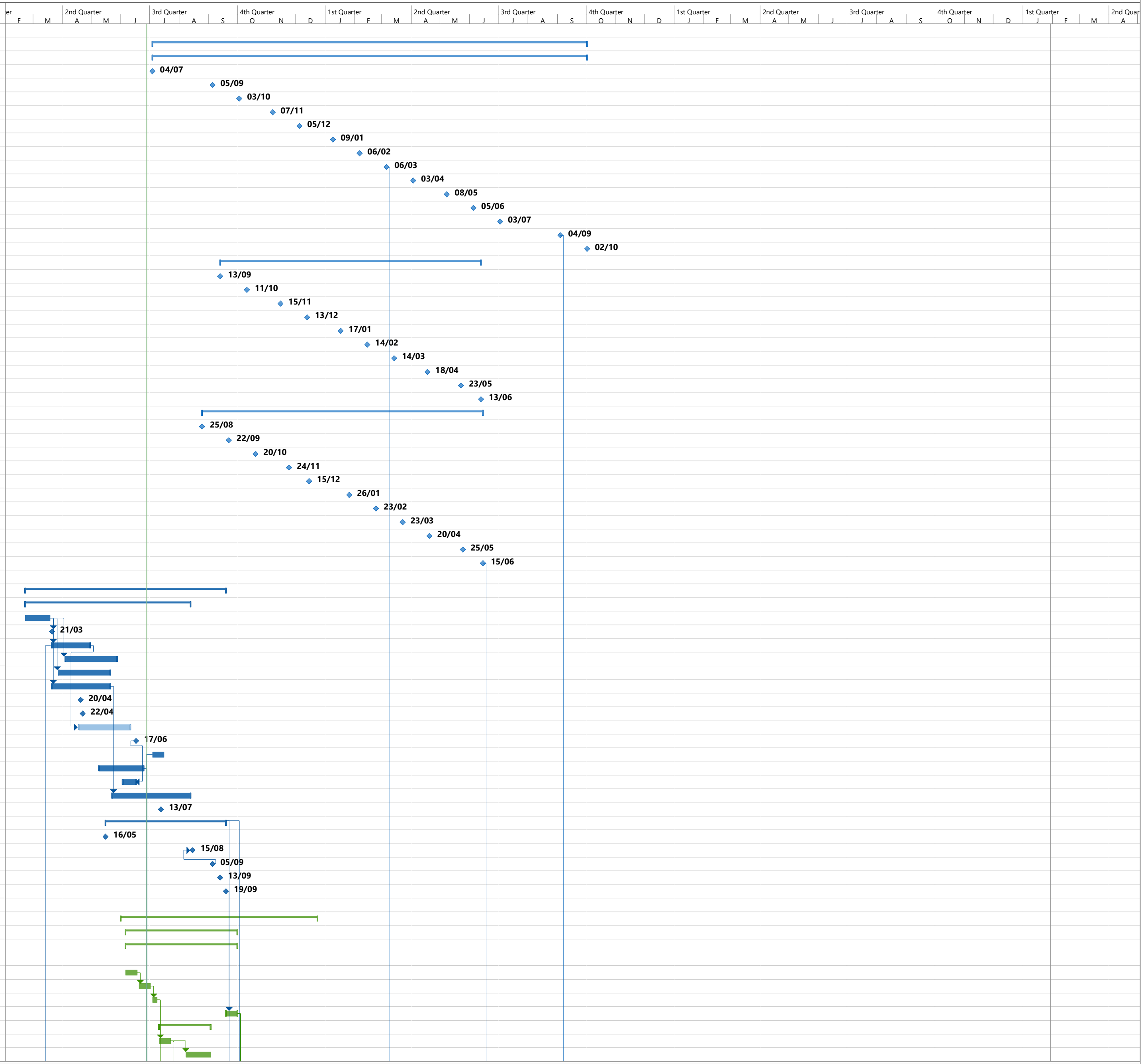
	BASE	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
		Higher income & base costs	Higher income & higher costs	Higher income & lower costs	Base income & lower costs	Base income & higer costs	Lower income & higher costs	Lower income & Lower costs
Income								
Dry side	[redacted]							
Health & Fitness								
Wetside								
Other Memberships								
Rentals								
Secondary								
Outdoor								
Total Income								
Expenditure								
Staffing costs:		0%	8%	-8%	-8%	8%	8%	-8%
Premises costs:	[redacted]							
Management costs:								
Cost of sales:								
Other costs:								
Total Expenditure								
Net Surplus/Deficit								

Excluding Lifecycle Costs

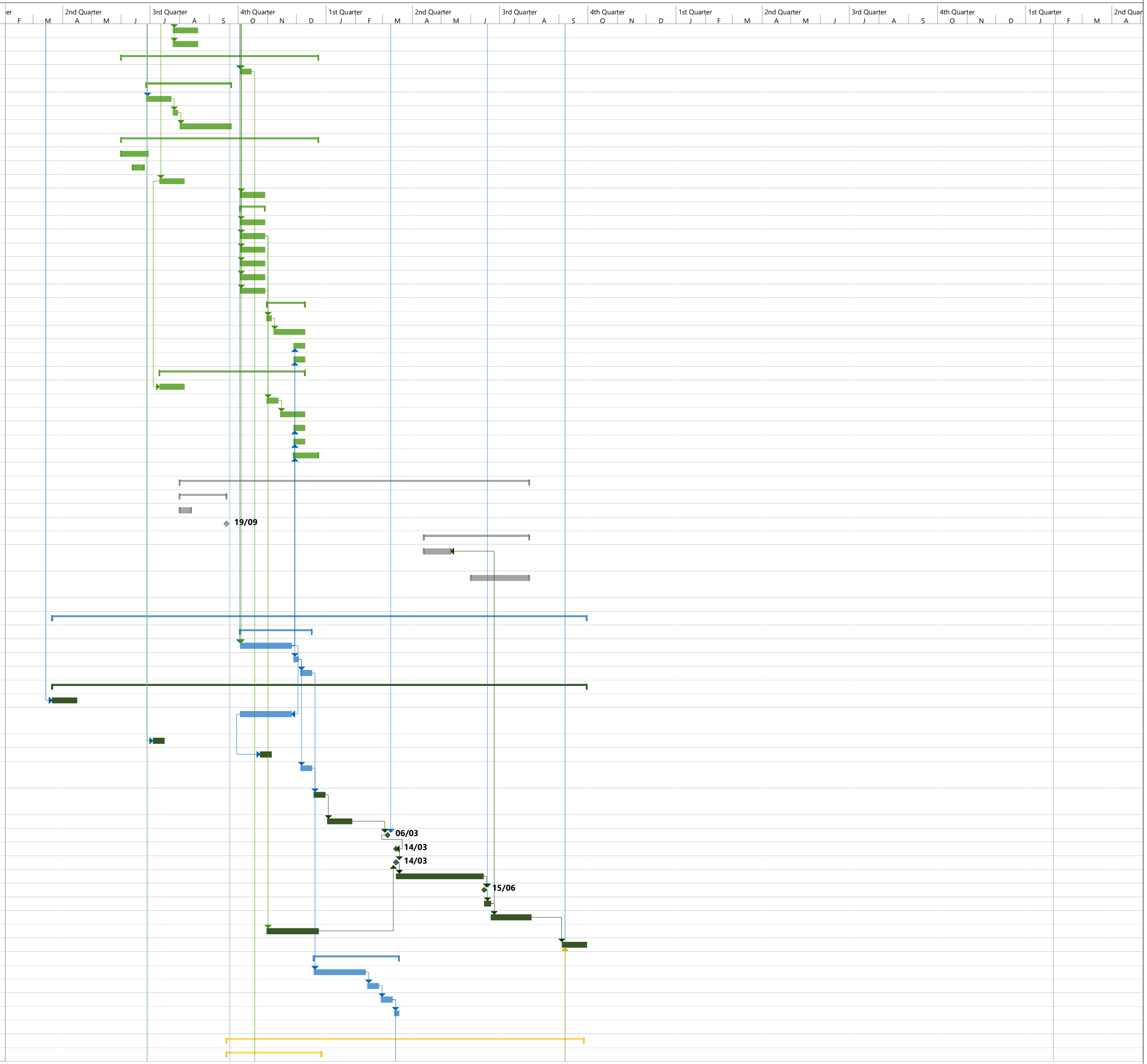
	BASE	Scenario 1 Higher income & base costs	Scenario 2 Higher income & higher costs	Scenario 3 Higher income & lower costs	Scenario 4 Base income & lower costs	Scenario 5 Base income & higer costs	Scenario 6 Lower income & higher costs	Scenario 7 Lower income & Lower costs
Income								
Dry side	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Health & Fitness	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Wetside	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Other Memberships	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Rentals	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Secondary	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Outdoor	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Income	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Expenditure								
Staffing costs:	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Premises costs:	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Management costs:	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Cost of sales:	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Other costs:	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Expenditure	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Net Surplus/Deficit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Appendix 10 – Detailed Programme

ID	Task Name	Duration	Start	Finish	Predecessors
1					
2	**Council Meetings**	**325 days**	**Mon 04/07/16**	**Mon 02/10/17**	
3	**Cabinet Meeting**	**325 days**	**Mon 04/07/16**	**Mon 02/10/17**	
4	4 July 16	0 days	Mon 04/07/16	Mon 04/07/16	
5	5 Sept 16	0 days	Mon 05/09/16	Mon 05/09/16	
6	3 Oct 16	0 days	Mon 03/10/16	Mon 03/10/16	
7	7 Nov 16	0 days	Mon 07/11/16	Mon 07/11/16	
8	5 Dec 16	0 days	Mon 05/12/16	Mon 05/12/16	
9	9 Jan 17	0 days	Mon 09/01/17	Mon 09/01/17	
10	6 Feb 17	0 days	Mon 06/02/17	Mon 06/02/17	
11	6 Mar 17	0 days	Mon 06/03/17	Mon 06/03/17	
12	3 Apr 17	0 days	Mon 03/04/17	Mon 03/04/17	
13	8 May 17	0 days	Mon 08/05/17	Mon 08/05/17	
14	5 June 17 - assumed	0 days	Mon 05/06/17	Mon 05/06/17	
15	3 July 17 - assumed	0 days	Mon 03/07/17	Mon 03/07/17	
16	4 Sept 17 - assumed	0 days	Mon 04/09/17	Mon 04/09/17	
17	2 Oct 17 - assumed	0 days	Mon 02/10/17	Mon 02/10/17	
18	**Scrutiny**	**195 days**	**Tue 13/09/16**	**Tue 13/06/17**	
19	13 Sept 16	0 days	Tue 13/09/16	Tue 13/09/16	
20	11 Oct 16	0 days	Tue 11/10/16	Tue 11/10/16	
21	15 Nov 16	0 days	Tue 15/11/16	Tue 15/11/16	
22	13 Dec 16	0 days	Tue 13/12/16	Tue 13/12/16	
23	17 Jan 17	0 days	Tue 17/01/17	Tue 17/01/17	
24	14 Feb 17	0 days	Tue 14/02/17	Tue 14/02/17	
25	14 Mar 17	0 days	Tue 14/03/17	Tue 14/03/17	
26	18 Apr 17	0 days	Tue 18/04/17	Tue 18/04/17	
27	23 May 17	0 days	Tue 23/05/17	Tue 23/05/17	
28	13 June 17 - assumed	0 days	Tue 13/06/17	Tue 13/06/17	
29	**Planning Committee**	**210 days**	**Thu 25/08/16**	**Thu 15/06/17**	
30	25 Aug 16	0 days	Thu 25/08/16	Thu 25/08/16	
31	22 Sept 16	0 days	Thu 22/09/16	Thu 22/09/16	
32	20 Oct 16	0 days	Thu 20/10/16	Thu 20/10/16	
33	24 Nov 16	0 days	Thu 24/11/16	Thu 24/11/16	
34	15 Dec 16	0 days	Thu 15/12/16	Thu 15/12/16	
35	26 Jan 17	0 days	Thu 26/01/17	Thu 26/01/17	
36	23 Feb 17	0 days	Thu 23/02/17	Thu 23/02/17	
37	23 Mar 17	0 days	Thu 23/03/17	Thu 23/03/17	
38	20 Apr 17	0 days	Thu 20/04/17	Thu 20/04/17	
39	25 May 17	0 days	Thu 25/05/17	Thu 25/05/17	
40	15 June 17 - assumed	0 days	Thu 15/06/17	Thu 15/06/17	
41					
42	**Design**	**150 days**	**Mon 22/02/16**	**Mon 19/09/16**	
43	**Stage 2 - Feasiblity Study / Concept Design**	**125 days**	**Mon 22/02/16**	**Fri 12/08/16**	
44	Project Initiation	4 wks	Mon 22/02/16	Fri 18/03/16	
45	Project meeting 1	0 days	Mon 21/03/16	Mon 21/03/16	44
46	Sequential test and planning review	6 wks	Mon 21/03/16	Fri 29/04/16	44
47	Background review & surveys	8 wks	Mon 04/04/16	Fri 27/05/16	44FS+2 wks
48	Stakeholder consultation and brief development	8 wks	Mon 28/03/16	Fri 20/05/16	44FS+1 wk
49	Development of facility options	9 wks	Mon 21/03/16	Fri 20/05/16	44
50	Benchmark visits	0 days	Wed 20/04/16	Wed 20/04/16	
51	Project meeting 2	0 days	Fri 22/04/16	Fri 22/04/16	
52	Management option and soft market test	8 wks	Mon 18/04/16	Fri 10/06/16	46
53	Project meeting 3	0 days	Fri 17/06/16	Fri 17/06/16	
54	Public consultation	2 wks	Mon 04/07/16	Fri 15/07/16	
55	Refinement of option	7 wks	Mon 09/05/16	Fri 24/06/16	
56	BREEAM Pre-Assessment (subject to appointment)	2 wks	Fri 03/06/16	Thu 16/06/16	53SF
57	Recommendations and conclusions	12 wks	Mon 23/05/16	Fri 12/08/16	49
58	Project meeting 4	0 days	Wed 13/07/16	Wed 13/07/16	
59	**Stage 2 - Council Approvals**	**90 days**	**Mon 16/05/16**	**Mon 19/09/16**	
60	Leadership Forum - 16 May 2016	0 days	Mon 16/05/16	Mon 16/05/16	
61	Submit Cabinet papers - 3 weeks prior to Cabinet Mt	0 days	Mon 15/08/16	Mon 15/08/16	62FS-3 wks
62	Cabinet Meeting - 5 September 2016	0 days	Mon 05/09/16	Mon 05/09/16	
63	Scrutiny (if called in)- 13 September 2016	0 days	Tue 13/09/16	Tue 13/09/16	
64	Special Cabinet Meeting (if required) - 19 Sept 2016	0 days	Mon 19/09/16	Mon 19/09/16	
65					
66	**Appointments**	**148 days**	**Wed 01/06/16**	**Fri 23/12/16**	
67	**Procure core consultants (Scape)**	**85 days**	**Mon 06/06/16**	**Fri 30/09/16**	
68	**PM, QS, Principal Designer, Architect, Structures/Civil, MEP**	**85 days**	**Mon 06/06/16**	**Fri 30/09/16**	
69	Seek formal proposal from F&G	2 wks	Mon 06/06/16	Fri 17/06/16	
70	Review and agree scope and terms	2 wks	Mon 20/06/16	Fri 01/07/16	69
71	Sign 'Option G' agreement	1 wk	Mon 04/07/16	Fri 08/07/16	70
72	Lead-in / consultant team appointments	2 wks	Mon 19/09/16	Fri 30/09/16	64
73	**Procure other consultant / specialist appointments**	**40 days**	**Mon 11/07/16**	**Fri 02/09/16**	
74	Agree consultants to be procured and scope	2 wks	Mon 11/07/16	Fri 22/07/16	71
75	Business planning	4 wks	Mon 08/08/16	Fri 02/09/16	74FS+2 wks

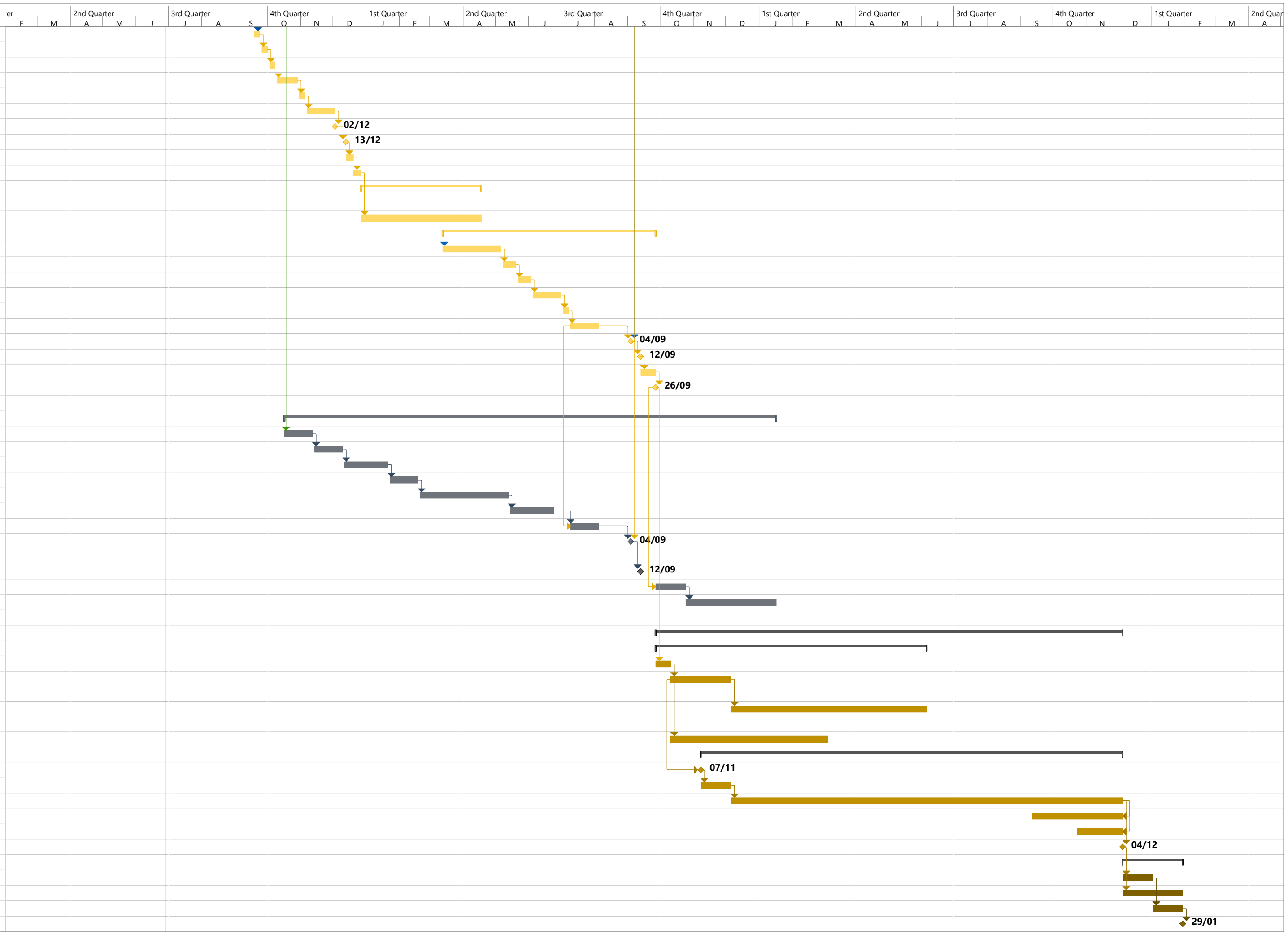


ID	Task Name	Duration	Start	Finish	Predecessors
76	Pool consultant	4 wks	Mon 25/07/16	Fri 19/08/16	74
77	Landscape architect	4 wks	Mon 25/07/16	Fri 19/08/16	74
78	**Surveys and planning requirements**	**148 days**	**Wed 01/06/16**	**Fri 23/12/16**	
79	Agree additional surveys/scopes to be completed	2 wks	Mon 03/10/16	Fri 14/10/16	59,72
80	**Ground surveys**	**65 days**	**Mon 27/06/16**	**Fri 23/09/16**	
81	Procure	4 wks	Mon 27/06/16	Fri 22/07/16	55
82	Underground services mapping	1 wk	Mon 25/07/16	Fri 29/07/16	81
83	Ground investigation	8 wks	Mon 01/08/16	Fri 23/09/16	82
84	**Planning Requirements**	**148 days**	**Wed 01/06/16**	**Fri 23/12/16**	
85	Reptile survey - need to be complete before July	4 wks	Wed 01/06/16	Tue 28/06/16	
86	Bat survey - needs to be completed before Sept	2 wks	Mon 13/06/16	Fri 24/06/16	
87	Procure planning consultant	4 wks	Mon 11/07/16	Fri 05/08/16	71
88	Town Centre Impact Assessment	4 wks	Mon 03/10/16	Fri 28/10/16	72
89	**Pre-application engagement**	**20 days**	**Mon 03/10/16**	**Fri 28/10/16**	
90	DCC Planning	4 wks	Mon 03/10/16	Fri 28/10/16	72
91	KCC Highways	4 wks	Mon 03/10/16	Fri 28/10/16	72
92	KCC Archaeology	4 wks	Mon 03/10/16	Fri 28/10/16	72
93	Lead Flood Authority	4 wks	Mon 03/10/16	Fri 28/10/16	72
94	Affinity Water	4 wks	Mon 03/10/16	Fri 28/10/16	72
95	Other utility providers	4 wks	Mon 03/10/16	Fri 28/10/16	72
96	**EIA Screening Opinion**	**30 days**	**Mon 31/10/16**	**Fri 09/12/16**	
97	Prepare Screening Opinion and submit	1 wk	Mon 31/10/16	Fri 04/11/16	95
98	Response period	5 wks	Mon 07/11/16	Fri 09/12/16	97
99	Arbicultural Impact Asessment	2 wks	Mon 28/11/16	Fri 09/12/16	119
100	Foul & Sewerage Assessment	2 wks	Mon 28/11/16	Fri 09/12/16	119
101	**Highways**	**110 days**	**Mon 11/07/16**	**Fri 09/12/16**	
102	Procure Transport Engineer	4 wks	Mon 11/07/16	Fri 05/08/16	87SS
103	Traffic survey (if required)	2 wks	Mon 31/10/16	Fri 11/11/16	91
104	Traffic Impact Assessment & Travel Plan	4 wks	Mon 14/11/16	Fri 09/12/16	103
105	Lighting Assessment	2 wks	Mon 28/11/16	Fri 09/12/16	119
106	Flood Risk Assessment	2 wks	Mon 28/11/16	Fri 09/12/16	119
107	LVIA	4 wks	Mon 28/11/16	Fri 23/12/16	119
108					
109	**Sport England Funding**	**261 days**	**Mon 01/08/16**	**Mon 31/07/17**	
110	**1st Stage**	**35 days**	**Mon 01/08/16**	**Mon 19/09/16**	
111	Prepare and submit Expression of Interest (EOI)	10 days	Mon 01/08/16	Fri 12/08/16	
112	Sport England initial funding decision	0 days	Mon 19/09/16	Mon 19/09/16	
113	**2nd stage**	**78 days**	**Thu 13/04/17**	**Mon 31/07/17**	
114	Prepare and submit Funding Application (6 wk prior to anticipated planning approval date)	4 wks	Thu 13/04/17	Wed 10/05/17	135FF-6 wks
115	Funding approval (subject to SE Project Committee dates, which are in June and July)	43 days	Thu 01/06/17	Mon 31/07/17	
116					
117	**Design & Planning**	**400 days**	**Mon 21/03/16**	**Fri 29/09/17**	
118	**Design - RIBA Stage 3**	**55 days**	**Mon 03/10/16**	**Fri 16/12/16**	
119	Stage 3 (Developed Design) - design phase	8 wks	Mon 03/10/16	Fri 25/11/16	59,72
120	Stage 3 - cost check and stage report	1 wk	Mon 28/11/16	Fri 02/12/16	119
121	Stage 3 - Client approval period	2 wks	Mon 05/12/16	Fri 16/12/16	120
122	**Planning**	**400 days**	**Mon 21/03/16**	**Fri 29/09/17**	
123	Engagement with planning officers - feasibility	4 wks	Mon 21/03/16	Fri 15/04/16	46SS
124	Engagement with planning officers - design development	8 wks	Mon 03/10/16	Fri 25/11/16	119FF
125	Public consultation - Stage 2 Concept	2 wks	Mon 04/07/16	Fri 15/07/16	54SS
126	Public consultation - 2nd round (if required)	2 wks	Mon 24/10/16	Fri 04/11/16	124SS+3 wks
127	Planning - Architect to Prepare Design & Access Statement	2 wks	Mon 05/12/16	Fri 16/12/16	120
128	Planning - Planning consultant to coordinate Detailed Application, including integration of work by others	2 wks	Mon 19/12/16	Fri 30/12/16	127
129	Cabinet lead-in (e.g. submission of report prior to)	4 wks	Mon 02/01/17	Fri 27/01/17	128
130	Cabinet approval of S106 and planning submission	0 days	Mon 06/03/17	Mon 06/03/17	11,129
131	Scrutiny (if required)	0 days	Tue 14/03/17	Tue 14/03/17	130SF+7 days
132	Submit detailed Planning Application	0 days	Tue 14/03/17	Tue 14/03/17	137,131
133	Determination period	13 wks	Wed 15/03/17	Tue 13/06/17	132
134	Planning Committee	0 days	Thu 15/06/17	Thu 15/06/17	133,40
135	Obtain Planning Consent	1 wk	Thu 15/06/17	Wed 21/06/17	134
136	Judicial Review	6 wks	Thu 22/06/17	Wed 02/08/17	135
137	Draft S106 / Development contributions	8 wks	Mon 31/10/16	Fri 23/12/16	91
138	Sign S106 / Development contributions	4 wks	Mon 04/09/17	Fri 29/09/17	136,166
139	**Design - RIBA Stage 4**	**65 days**	**Mon 19/12/16**	**Fri 17/03/17**	
140	Stage 4 (Final Proposals/Old Stage E) - design phase	8 wks	Mon 19/12/16	Fri 10/02/17	121
141	Stage 4 (Tender Docs) - Prepare Employer's Requireme	2 wks	Mon 13/02/17	Fri 24/02/17	140
142	Stage 4 - cost check and amendments	2 wks	Mon 27/02/17	Fri 10/03/17	141
143	Stage 4 - Client approval period	1 wk	Mon 13/03/17	Fri 17/03/17	142
144					
145	**Contractor procurement (SC framework)**	**267 days**	**Mon 19/09/16**	**Tue 26/09/17**	
146	**Stage 1 Tender**	**71 days**	**Mon 19/09/16**	**Mon 26/12/16**	



Dover District Council
Project programme - Rev B2 - De-risk planning

ID	Task Name	Duration	Start	Finish	Predecessors
147	Sign User Agreement & prepare tender docs	1 wk	Mon 19/09/16	Fri 23/09/16	59
148	Mini-Competition 1 (pre-qual)	1 wk	Mon 26/09/16	Fri 30/09/16	147
149	Agree shortlist	1 wk	Mon 03/10/16	Fri 07/10/16	148
150	Mini-Competition 2 (tender)	3 wks	Mon 10/10/16	Fri 28/10/16	149
151	Tender assessment and interviews	1 wk	Mon 31/10/16	Fri 04/11/16	150
152	Cabinet lead-in (e.g. submission of report prior to)	4 wks	Mon 07/11/16	Fri 02/12/16	151
153	Cabinet approval	0 days	Fri 02/12/16	Fri 02/12/16	152
154	Scrutiny (if required)	0 days	Tue 13/12/16	Tue 13/12/16	153
155	Tenderers notified	1 wk	Tue 13/12/16	Mon 19/12/16	154
156	Sign Pre-Construction Service Agreement (PCSA)	1 wk	Tue 20/12/16	Mon 26/12/16	155
157	**Contractor input (under pre-construction services agreement)**	**80 days**	**Tue 27/12/16**	**Mon 17/04/17**	
158	Buildability and cost input - exact scope TBC	4 mons	Tue 27/12/16	Mon 17/04/17	156
159	**Stage 2 Tender**	**142 days**	**Mon 13/03/17**	**Tue 26/09/17**	
160	Tender sub-contractor packages	8 wks	Mon 13/03/17	Fri 05/05/17	142
161	Pricing	2 wks	Mon 08/05/17	Fri 19/05/17	160
162	Tender assessment and interim report	2 wks	Mon 22/05/17	Fri 02/06/17	161
163	Negotiate with contractor to agree final contract	4 wks	Mon 05/06/17	Fri 30/06/17	162
164	Final tender report	1 wk	Mon 03/07/17	Fri 07/07/17	163
165	Cabinet lead-in (e.g. submission of report prior to)	4 wks	Mon 10/07/17	Fri 04/08/17	164
166	Cabinet approval to enter into Construction Contract	0 days	Mon 04/09/17	Mon 04/09/17	165,16
167	Scrutiny (if required)	0 days	Tue 12/09/17	Tue 12/09/17	166FS+7 days
168	Sign Construction Contract	2 wks	Wed 13/09/17	Tue 26/09/17	167
169	Contractor appointed	0 days	Tue 26/09/17	Tue 26/09/17	168
170					
171	**Operator Procurement**	**327 days**	**Mon 17/10/16**	**Tue 16/01/18**	
172	Procure & appoint consultant and legals	4 wks	Mon 17/10/16	Fri 11/11/16	79
173	Preparation phase	4 wks	Mon 14/11/16	Fri 09/12/16	172
174	Pre-qualification (PQQ)	6 wks	Mon 12/12/16	Fri 20/01/17	173
175	Evaluate PQQ submissions and shortlist	4 wks	Mon 23/01/17	Fri 17/02/17	174
176	Tender phase	3 mons	Mon 20/02/17	Fri 12/05/17	175
177	Tender evaluation	6 wks	Mon 15/05/17	Fri 23/06/17	176
178	Cabinet lead-in (e.g. submission of report prior to)	4 wks	Mon 10/07/17	Fri 04/08/17	165SS,177
179	Cabinet approval to appoint Operator (at same time as Constructon Contract)	0 days	Mon 04/09/17	Mon 04/09/17	178,166
180	Scrutiny (if required)	0 days	Tue 12/09/17	Tue 12/09/17	179FS+7 days
181	Appoint operator	4 wks	Wed 27/09/17	Tue 24/10/17	169SS
182	Contractor mobilisation	3 mons	Wed 25/10/17	Tue 16/01/18	181
183					
184	**Construction and Hand Over**	**310 days**	**Wed 27/09/17**	**Tue 04/12/18**	
185	**Contractor's design development and procurement**	**180 days**	**Wed 27/09/17**	**Tue 05/06/18**	
186	Lead in	2 wks	Wed 27/09/17	Tue 10/10/17	169
187	Stage 4 - Technical Design / Construction details (initial works packages)	8 wks	Wed 11/10/17	Tue 05/12/17	186
188	Stage 4 - Technical Design / Construction details (all other works packages)	26 wks	Wed 06/12/17	Tue 05/06/18	187
189	Appointment of sub-contractors	104 days	Wed 11/10/17	Mon 05/03/18	186
190	**Construction**	**280 days**	**Tue 07/11/17**	**Tue 04/12/18**	
191	Construction works start on site	0 days	Tue 07/11/17	Tue 07/11/17	187SS+1 mon
192	Enabling works	1 mon	Wed 08/11/17	Tue 05/12/17	191
193	Construction works	13 mons	Wed 06/12/17	Tue 04/12/18	192
194	M&E commissioning	12 wks	Wed 12/09/18	Tue 04/12/18	193FF
195	Training and familiarisation	6 wks	Wed 24/10/18	Tue 04/12/18	193FF
196	Practical Completion	0 days	Tue 04/12/18	Tue 04/12/18	193
197	**Fit Out and Soft Landing**	**40 days**	**Wed 05/12/18**	**Tue 29/01/19**	
198	Client's fit out	4 wks	Wed 05/12/18	Tue 01/01/19	196
199	Contractor support in operating systems and further trai	8 wks	Wed 05/12/18	Tue 29/01/19	196
200	Soft opening for current members	4 wks	Wed 02/01/19	Tue 29/01/19	198
201	Centre opens	0 days	Tue 29/01/19	Tue 29/01/19	200



Appendix 11 – Risk Register

Dover Leisure Centre - Project Risks
Dover District Council

Revision: B

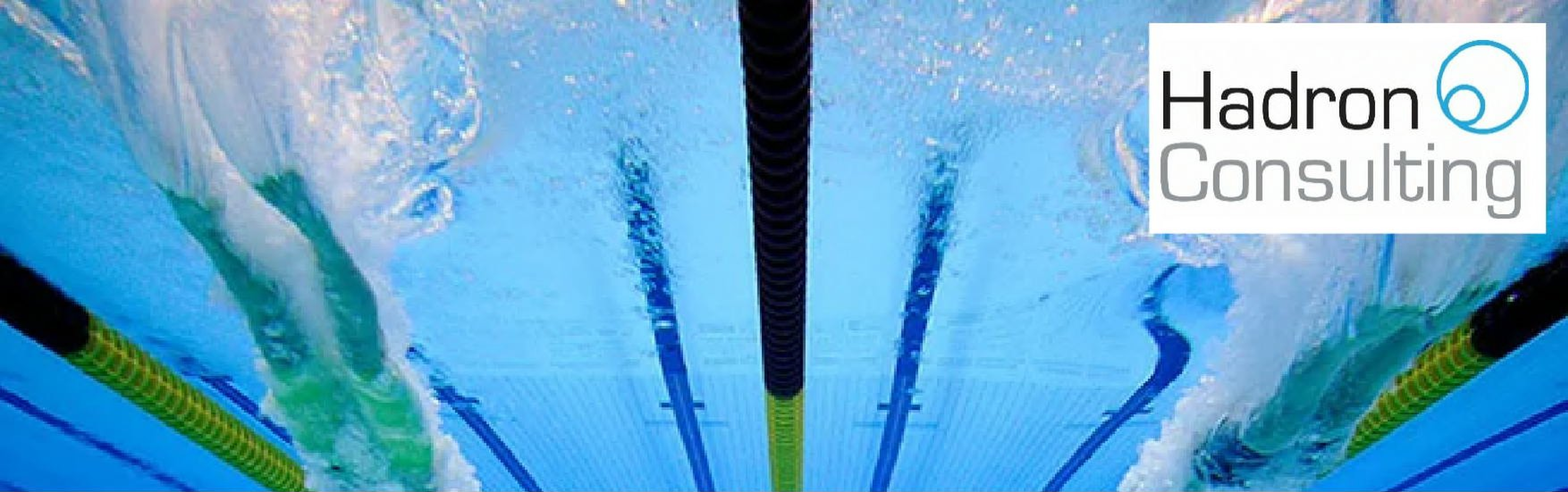
			Assessment of Risk						
Risk ID Code	**Risk Area**	**Risk Description**	**Impact (1 - 5)**	**Likelihood (1 - 5)**	**Score**	**Action Taken (Provide details of what you have done to date to manage the risk)**	**Further Action to be Taken (Describe what further actions you will take to reduce the impact/ likelihood should the risk become an issue)**	**Risk Owner**	**Further survey work to be undertaken to establish and/or mitigate risk**
B01	Brief	Changes to facility mix / brief.	4	4	**16**	Core facility mix agreed as part of Stage 2 Feasibility Study. This has also been discussed with Leadership Forum.	Review of the facility mix is being carried out as part of the Stage 2 Feasibility to achieve sign off of the facility mix as part of the September Cabinet approval. Any changes to the facility mix / brief to be subject to an assessment of the cost, programme and business plan implications before changes are made.	DDC	
C01	Cost	Land purchase is more than anticipated and/or makes the project unaffordable.	5	4	**20**	Council have commenced negotiations with the land owner.	Council to continue negotiations with the land owner. Formal public consultation not to take place until negotiations have been concluded to maintain negotiating position.	DDC	
C02	Cost	Project costs exceed budget/available funding (affordability).	4	4	**16**	Experienced consultant team have been appointed to develop Stage 2 design and cost plan. Current funding gap is c.£2.3m, which it is assumed will be funded from the Council's capital reserves.	Cost consultant appointed to prepare cost plan based on similar projects. Allowances to be made for all of the costs to deliver the project, including construction, professional team, off-site works, fit out, etc., etc. Contingency to be included commensurate with the stage of the project. Costs to be closely monitored as the project progresses.	DDC	
C03	Costs	Increase in tender prices.	4	4	**16**	Allowance included for tender inflation based on BCIS Indices. Early involvement of the contractor through the two stage approach will provide good market intelligence.	To be reviewed on a regular basis and allowance adjusted.	DDC	
C04	Costs	Increase in cost estimate due to scope creep or inclusion of good ideas/nice to haves.	4	4	**16**	Experienced consultant team have been appointed to develop an efficient Stage 2 design.	Design to be closely monitored and the implications of any changes to be fully outlined to the Council for approval before proceeding with changes. Formal Change Control process to be introduced from the start of Stage 3.	DDC	
D01	Design	Changes in design due to new consultant team or delay due to the new team getting up to speed.	4	4	**16**	Consultant procurement options have been considered.	Appointment of current consultant team being looked into.	DDC	
D02	Design	Design doesn't meet Council expectations.	4	4	**16**	Case study visits have been carried out with key officers and members. Flitwick Leisure Centre has been agreed as the benchmark for this project.	Formal project governance and approval process to be put in place. Technical Steering Group to be put in place to review the developing design and provide direction to the design team. Formal stage reports to be provided at key design stages for sign off.	DDC	
D03	Design	Operator requires changes to the design incurring additional cost or impacting on programme.	4	4	**16**	Programme seeks to bring on board the operator at the earliest opportunity so they can input on design.	No further action at this stage.	DDC	
D04	Design	Building location changed.	5	3	**15**	A number of options have been considered and a preferred location selected for completion of the Stage 2 Feasibility Study.	No further action at this stage, but risk rating remains high until Stage 2 design has been signed off.	DDC	
D05	Design	Poor quality finishes specified, which impacts on maintenance costs and business plan.	4	4	**16**	Case study visits have set the benchmark to be followed.	Specifications to be reviewed as the design is developed. Life cycle cost analysis to be carried out to aid choice of materials.	DDC	
D06	Design	Sport England standards not met.	4	3	**12**	Design Team appointed for Stage 2 have worked with Sport England on other projects and have a good understanding of Sport England standard.	Design Team with Sport England experience to be appointed for Stage 3 onwards. Any deviations from Sport England standards to be raised by the Design Team and discussed with Sport England.	DDC	
E01	Ecology	Ecologically impacts on building design or impacts on the delivery programme.	4	4	**16**	No information currently available, hence the high risk rating.	Preliminary Ecological Survey being carried out. Additional surveys and mitigation measures to be confirmed once received.	DDC	Preliminary Ecological Survey + reptile and bat surveys
F01	Finance/Funding	Sport England funding not obtained.	5	4	**20**	Initial meeting held with Sport England to discuss the project. Timeline for applications and approvals included in project programme. Sport England funding could be £1m-£1.5m, whereas the working assumption is £1m which is at the lower end. However, no current commitment, hence the high risk rating.	Dialogue to continue to Sport England once Cabinet approval has been received. Procurement strategy, consultant and contractor appointments to be discussed with Sport England to ensure their buy in.	DDC	
F02	Finance/Funding	Business Plan projections aren't met and can't support prudential borrowing.	5	3	**15**	The Sports Consultancy has been appointed to prepare the Business Plan. This is based on a prudent business plan. Facility mix has been soft market tested with key operators, with good feedback received.	Operator to be tendered in parallel with the construction contract so that the full financial position is known at the time contracts are placed.	DDC	
F03	Finance/Funding	Increase in Prudential Borrowing rates.	5	3	**15**	Current assumption is 40 year loan @ 3.75% on an annuity basis.	To be closely monitored.	DDC	

F04	Finance/Funding	Change in financial stability of the Council.	5	3	15	No current action proposed.	To be closely monitored.	DDC	
G01	Governance	Change in Council administration impacting on project.	5	3	15	Current cross-party support.	To be closely monitored.	DDC	
G02	Governance	Change in key Council Officers.	4	3	12	No current action proposed.	To be closely monitored and mitigation strategy put in place if this occurs.	DDC	
OP01	Operation	Gap in continuity of leisure provision, e.g. existing centre has to close early and prior to completion of the new centre.	3	4	12	Risk of significant failure of plant, fabric or other systems at the existing centre that is uneconomic to repair.	To be closely monitored and communicated early if this risk materialises.	DDC	
OP02	Operation	Maintenance obligations not met on current centre.	4	4	16	Contractual obligations of the current operator to be closely monitored.		DDC	
OP03	Operation	Operators not interested in project.	4	2	8	Initial soft market testing has shown there to be strong operator interest in the project.	Clear procurement process to be set out. Robust tender documents to be prepared. Robust and open tender process to be run. Consider appointment of experienced consultant to run the procurement process.	DDC	
OP04	Operation	Inclusion of older Tides centre in the operator contract impacts on market interest or compromises financial offers.	4	2	8	Initial soft market testing has shown there to be strong operator interest in the project even if Tides is included.		DDC	
OP05	Operation	Existing operator doesn't perform and standard at existing centre compromised if they don't win the new contract.	4	4	16	Contractual obligations of the current operator to be closely monitored.	This would need to be closely monitored in this eventuality.	DDC	
P01	Planning	Insufficient parking impacts on business plan.	4	4	16	Car parking numbers being looked at as part of Stage 2 design.	Car park numbers to be assessed as part of Transport Assessment.	DDC	Transport Assessment
P02	Planning	Future of the existing leisure centre site is linked to the planning application for the new centre.	4	2	8	It is not currently anticipated that the future of the existing centre will be linked to the new centre planning application.	Continue dialogue with planning team.	DDC	
P03	Planning	Planning application is rejected or consent is delayed.	4	3	12	Proposals are a departure from the Employment Use planning designation. Planning consultant has been appointed to carry out Sequential Test and provide early planning advise. Discussions have taken place with the planning team to ensure this meets their requirements and to agree documents to be submitted with the planning application.	Design to be developed to Stage 3 to ensure robust planning application is submitted. Pre-app submission and meeting to take place.	DDC	
P04	Planning	Judicial Review of the planning decision.	4	2	8	This is consider to be a low risk, but is identified as a risk to monitor.	No further action proposed at this stage.	DDC	
P05	Planning	Public opposition to the new centre.	4	3	12	Good response received to initial public communications about the new centre.	Formal public consultation/communication of the Stage 2 proposals to be carried out.	DDC	
P06	Planning	Significant Town Centre impact.	4	3	12	This is not thought to be an issue, but a formal assessment has not been completed, hence the slightly higher risk rating.	Town Centre Impact Assessment to be carried out.	DDC	Town Centre Impact Assessment
P07	Planning	Onerous planning condition requiring changes to the design or incurring additional cost.	3	4	12	Unknown at this stage, hence the higher risk rating.	Surveys / report to be commissioned to support the planning application, which will inform the likely planning requirements. Discussions to take place with relevant departments included EHO, Ecology, Archaeology, Highways, etc. to agree the surveys/reports required and discuss the report outcome and recommendations to pre-empt the likely planning conditions.	DDC	
P08	Planning	Full EIA required.	4	4	16	Initial view is that this won't be required, but this won't be confirmed until initial surveys are complete and EIA Screening Opinion is submitted, hence the high risk rating.	Undertake initial surveys/reports and submit EIA Screening Opinion at the earliest opportunity. Make allowance in programme for EIA Screening Opinion process.	DDC	
P09	Planning	Planning decision called in by the Secretary of State.	4	2	8	Unlikely to be called in, but identified as a risk to monitor.	No further action proposed at this stage.	DDC	
P10	Planning	Flood risk	3	3	9	Site is in 'Flood Zone 1' with minimal risk of flooding, hence the low risk.	A Flood Risk Assessment and Drainage Management Plan to be carried out as part of the Stage 3 design.	DDC	Flood Risk Assessment
P11	Planning	S106 Agreement/Developer Contribution required for offsite highway improvements or contribution to Bus Rapid Transit	4	5	20	It is likely that a contribution will be sought to the BRT.	Initial discussions to be held with bus operator. Transport Engineer to be appointed to carry out Transport Assessment.	DDC	Transport Assessment
P12	Planning	Sequential test identifies an alternative site as being more suitable in planning terms.	5	2	10	A number of sites were reviewed as part of the Sports Consultancy Feasibility Study, from which the preferred site was selected.	DHA have been appointed to carry out a formal sequential test. The initial view is that this will support the preferred site.	DDC	Sequential test
PR01	Procurement	Challenge by unsuccessful contractor	3	3	9	Likelihood of challenge is reduced through the proposed use of the SC Framework rather than a full OJEU.	Robust and open tender process to be run in full compliance with SC Framework and OJEU rules.	DDC	
PR02	Procurement	Lack of interest in the project by contractors.	4	3	12	Two stage procurement route proposed to make the project more appealing to the market. This also reflects the limited number of suitable contractors in the local market, and the current buoyant tender market. Positive response received from three experienced contractors to the soft market testing of the SC Framework.	Continue to engage with the interested SC Framework contractor and provide regular updates on progress and dates for tender to ensure they have a bid team ready.	DDC	

PROG01	Programme	Poor performance by the Consultant Team. Change in key personnel.	4	3	12	Experienced consultant team have been appointed to carry out Stage 2 Feasibility Study.	Experienced consultant team to be procured for Stage 3 onwards and appointment to seek to prevent change to key personnel where possible.	DDC	
PROG02	Programme	Decisions not provided in a timely manner causing delay to the programme.	5	3	15	Programme sets out key project stages and when Cabinet approval is required.	Communications strategy to be prepared.	DDC	
PROG03	Programme	Cabinet approval not received or delayed.	4	4	16	Programme includes allowance for preparation and obtaining Cabinet approval.	To be monitored.	DDC	
PROG04	Programme	Consultant team doesn't meet programme.	4	4	16	Programme is very tight and includes no contingency, hence the high risk rating.	Expectations to be managed on the opening date of the new centre to allow contingency for delay.	DDC	
PROG05	Programme	Construction programme is insufficient.	4	5	20	Programme is based on similar projects, but it is very tight and includes no contingency, hence the high risk rating. Initial feedback via the SC Framework soft market testing was mixed with some contractors expressing a nervousness at the length of the construction programme allowance.	Programme to be tested through Stage One tender for contractor. Early involvement of the contractor will identify any programme concern at an early stage.	DDC	
PROG06	Programme	Delay during construction due to weather or unforeseen events.	4	4	16	Programme is based on similar projects, but it is very tight and includes no contingency, hence the high risk rating.	Transfer programme risk to contractor where possible. Weather is likely to be an exception to this.	DDC	
PROG07	Programme	Lack of availability of materials or resource during construction.	4	3	12	Transfer risk to contractor.		DDC	
S1	Site	Poor ground conditions.	5	4	20	Initial desktop study suggests that ground conditions may be suitable for shallow pads and ground bearing slabs. However, a high risk rating has been noted pending the on site investigations.	Cost allowance to be included for a piled solution until further ground information is available. Ground conditions to be verified as part of Ground Investigation.	DDC	Ground Investigation
S2	Site	High ground water.	4	2	8	Desktop review suggests that groundwater is likely to be more than 5m below the surface, which shouldn't therefore affect the project.	Groundwater levels to be verified as part of Ground Investigation	DDC	Ground Investigation
S3	Site	Surface water strategy to use deep bored soakaways not possible and connection required to sewer network.	4	4	16	Desktop review carried out of the surface water (SW) drainage, which suggests deep bored soakaways supplimented by underground attenuation tanks is appropriate for the site (SUDS features, e.g. swales and ponds) are not consider suitable for this site). Rainwater harvesting is also an option to reduce the quantity of water to be discharged.	On site soakaway testing to be carried out as part of Ground Investigation. Application to be made to Environment Agency if final proposal incorporates discharge to ground.	DDC	Ground Investigation
S4	Site	Unground obstructions found during construction.	4	3	12	No information currently available, however there has been no previous buildings on site, hence the relatively low risk rating.	Given the previous site use, no further investigations are proposed. Considering transferring the residual risk to the contractor.	DDC	
S5	Site	Unground services found during construction, which requires protection or diversion.	5	2	10	Nothing has been identified on the topographical survey and utilities search, hence the low risk ratings.	No further action proposed at this stage. Consider transferring the residual risk to the contractor.	DDC	
S6	Site	Archaeological remains found during construction.	4	3	12	No information currently available.	Desktop assessment to be carried out as part of Stage 3. Ground Penetrating Radar Survey to be carried out if desktop assessment identifies potential for archaeology. Trial trenches only to be undertaken if the desktop assessment and RADAR survey identifies anything. Approach to be discussed with the County Archaeologist once the desktop assessment has been completed.	DDC	Archaeological Desktop Assessment
S7	Site	Unexploded Ordinance (bomb) found during construction.	5	3	15	No information currently available.	UXO desktop assessment to be carried out. Radar survey to be carried out if this identifies a risk.	DDC	UXO Desktop Assessment
S8	Site	Topography impacts on design efficiency.	3	3	9	Topographical survey has been completed. The preferred site is relatively flat, which in turn allows for a relatively simply and efficient design, hence the low risk rating.	Stage 3 design to be tested and refined based on the topographical survey completed.	DDC	
S9	Site	Visual impact.	4	4	16	The site is currently a farmed field and the proposals will therefore have a significant visual impact. Photos have been taken from key views to demonstrate the impact in the summer and winter months for use in the LVIA.	A Landscape Visual Impact Assessment (LVIA) to be carried out during Stage 3.	DDC	LVIA
S10	Site	Road access need to be improved.	3	2	6	There is an existing road and entry point to the site, which is unlikely to require modification. However, the current Stage 2 proposals require S278 works to provide a coach drop off on the highway, hence the higher risk rating.	Stage 3 design to look at accommodating a coach drop off within the site boundary and eliminate the requirement for highway modifications and/or a S278 Agreement. Transport Engineer also to be appointed to assess this as part of the Transport Assessment.	DDC	
S11	Site	Ground contamination or material not suitable for reuse on site.	4	2	8	No information currently available, but previous agricultural use of the site suggest this won't be an issue, hence the low risk rating.	Ground investigation to be carried out.	DDC	Ground Investigation
SO01	Site Ownership	Delay / unable to purchase the site.	5	5	25	Council have commenced negotiations with the land owner.	Council to continue negotiations with the land owner. Consider progressing discussions with adjoining land owner in parallel to maintain some leverage and have a fall back option.	DDC	
SO02	Site Ownership	Site boundary unconfirmed and/or the land comes with restrictive covenants or easements.	4	4	16	Council have commenced negotiations with the land owner.	Council to request details from the landowner. Land registry search also to be carried out to obtain Land Registry details.	DDC	
STAT01	Statutory	Changes required to obtain Building Control sign off.	3	2	6	Assuming the appointment of a competent design team and the early input of the contractor through a two-stage procurement route, then this risk is considered to be low	Experience design team to be appointed. Contractor to be brought on board early through a two-stage procurement route. Building Control to be appointed to carry out a plan review and inspections during construction.	DDC	

SUST01	Sustainability	BREEAM Very Good not achieved.	4	4	16	Council planning policy is BREEAM Very Good. This is more difficult to achieve on a green field site and a leisure centre/pool building. BREEAM Pre-Assessment has been carried out which suggests a score of 61.75% could be achieved which provides a buffer to the 55% required for Very Good. Allowance made in Cost Plan for BREEAM requirements, including an ecological roof.	BREEAM advisor to be appointed in Stage 3 to progress the BREEAM requirements.	DDC	
SUST02	Sustainability	New centre costs more to run.	4	3	12	Premise is that the building is to be efficient and reduce running costs.	EPC Rating to be achieved to be confirmed in conjunction with the design team. Cost plan to include for energy efficient systems, thermally efficient building fabric and good quality finishes. Avoid untried technology. Maximise use of natural light.	DDC	
U01	Utilities	Insufficient water supply capacity to serve the proposed development. Increased cost and programme delay. Payment required for offsite works.	5	5	25	Water supply is thought to be the biggest issues and the Council have commenced discussions with Affinity Water. Utilities are notoriously difficult to deal with, particularly if new supplies are required and discussions need to commence early.	Existing services and capacity requirements being looked at by the consultant team as part of the Stage 2 Feasibility Study along with the likely works required to serve the site. Council to commence discussions with Utility companies once this information is available.	DDC	
U02	Utilities	Insufficient foul water drainage capacity.	4	4	16	Desktop reviews suggests the foul water can be connected to a manhole to the adjacent Honeywood Parkway road. Foul water capacity check has been instructed to identify any upgrades required to the existing infrastructure including sewers and pumping stations.	Discussions to commence with Southern Water to agree method of discharge and flow rate once capacity check complete. Design and costs to assume on site attenuation as a worst case until further information is available. Note also that a trade effluent licence is likely to be required for the backwash discharge.	DDC	Foul water capacity check
U03	Utilities	Insufficient electrical supply and/or nothing local to the site.	5	4	20	Desktop review suggests a new 500kVA sub-station will be required. Unclear where supply will be taken from, hence the high risk rating.	Further investigation required. Including discussions with UKPN.	DDC	Further enquiries with UKPN

Appendix 12 – Procurement Options Paper



Dover Leisure Centre

Procurement Review

28 June 2016

Contents

Introduction
Overview

Project Background

A new Leisure Centre is being developed by Dover District Council to replace the existing Dover Leisure Centre. Further information about this can be found in the Stage 2 Feasibility Study.

Procurement Review

This report discusses the options for the procurement of the Operator and the Main Contractor, and summarises the proposed way forward.

A Procurement Workshop was held on 28 April 2016 with Council officers and members of the Consultant Team, and this report reflects the discussions at the workshop.

Soft market testing has also been carried out with key operators and contractors on the proposed contractor framework, which supports the proposed way forward.

Procurement Requirements

A structured and systematic approach is required in order to select the most suitable option for the project. The client's project objectives, especially in terms of cost, time, quality, risk and control must be clearly defined and the above options are reviewed against these to determine the most appropriate form of procurement for this project.

The broad purpose of contract procurement is to appoint an appropriately skilled contractor and/or operator, with the right team, agreed costs, programme and appropriate transfer of risk. This simple objective has become more difficult to achieve as project programmes are condensed, and both clients and contractors/operators seek to protect their position with regard to apportionment of risk.

Market Context

The construction market contracted during the recession and is struggling to cope with the increase in construction projects coming to the market. Contractors are therefore being more selective about the projects they bid for and will often only tender for those projects where their bid costs are kept to a minimum. The location of the project also reduces the number of contractors with the capability and experience to do this type of project.

Council Priorities

When considering the procurement route, the following key considerations should be looked at, as they will directly influence the procurement route adopted.

The following priorities were established during the Procurement Workshop, and the proposed way forward reflects these priorities.

- Programme – Whilst the Council would like the centre to be open as soon as possible, programme is not the key driver.
- Cost certainty – A fixed price needs to be obtained for both the operator and construction contract before works start on site.
- Risk transfer - Risk should be transferred to the contractor and operator where appropriate.
- High quality – This is a high priority, however this must be balanced against obtaining cost certainty and risk transfer where appropriate. It will therefore be important to ensure the design is developed to a reasonably high level of detail to protect the design intent.
- Compliant with Public Contract Regulations – e.g. OJEU compliant.

Introduction
Overview

Procurement Options

This report sets out the options available for the procurement of the operator and contractor for the Dover Leisure Centre. The options considered are:

Operator

- Design & Build contract and separate leisure management contract.
- Design, Build, Operate and Maintain (DBOM).
- Design, Build, Finance, Operate and Maintain (DBFO).
- Asset transfer/long lease.

Contractor

Procurement Routes:

- Traditional.
- Management Contracting & Construction Management.
- Partnering.
- Design and Build.

Procurement Options:

- Single stage.
- Two stage.

Commercial approaches:

- Fixed price (lump sum).
- Guaranteed maximum price.
- Target cost.

OJEU Compliant Procurement:

- A framework.
- Use the OJEU procedure.

Introduction
Terminology

The level of design development is referred to using the definitions provided by the Royal Institute of British Architects, the "RIBA", and for ease of reference the main design stages are noted in the following table. We have also referenced the latest definitions from the RIBA Plan of Work 2013, with those in the previous version, the RIBA Outline Plan of Work 2007, which is still referred to in the construction industry.

RIBA Stages RIBA Plan of Work 2013	RIBA Stages RIBA Outline Plan of Work 2007	Summary (based on information to be provided by the architect)
Stage 0 - Strategic Definition	No stage in 2007 Plan of Work	Review feasibility
Stage 1 - Preparation and Brief	Stage A (Appraisal) and B (Strategic Brief)	Preparation and development of the Client Brief and initial design solutions
Stage 2 - Concept Design	Stage C - Outline Proposals	Site master plan, floor plans, elevations, typical sections, indicative material schedule
Stage 3 - Developed Design	Stage D+ - Detailed Proposals	Development of floor plans, elevations, sections, room data sheets, building materials. Fully coordinated with other consultants.
Stage 4 - Technical Design	Stage E - Final Proposals	Detailed design and specification.
	Stage F - Production Information	Construction details
	Stage G and H - Tender	Preparation of tender documents and tender period.
Stage 5 – Construction	Stage J (Mobilisation) and K (Construction Period)	Tasks to be performed under the construction contract.
Stage 6 - Handover and Close Out	Stage L - Defect Liability Period	Duties under the Defect Liability Period
Stage 7 - In Use	No stage in 2007 Plan of Work	Post occupancy review

Operator
Procurement Discussion

Operator Procurement

The following topics were reviewed as part of the Procurement Workshop:

- Procurement options/routes, including:
    - Separate construction contract and leisure management contract
    - Design, Build, Operate and Maintain (DBOM)
    - Design, Build, Finance, Operate and Maintain (DBFO)
    - Asset transfer/long lease.
- Summary of current operator market
- Why test the market?
- Timescales for procurement and when best to appoint the operator
- Operator input to design and final specification
- Funding from operators
- Key contract terms and considerations:
    - Length of contract (co-termination)
    - How to maximise interest from contractors
    - Maintenance responsibilities
    - Management fee arrangements.
- Soft market testing

Operator Procurement Recommendation

We have not included a full operator procurement review in this report due to the commercial sensitivities, and further discussion required to conclude this.

It was however agreed that the leisure management contract and construction contract should be procured separately, and the remainder of the report focuses on this.

It was also agreed that the procurement of the leisure management contract should be progressed in parallel with the construction contract so that the commercial position for the operator is known before entering into the construction contract.

Contractor
Procurement Routes

Traditional

With traditional contracting, design is clearly and definitely separated from construction. There are three key teams in the procurement process: the employer, the design team and the contractor.

Having developed a Design Brief from the employer, the architect produces detailed drawings and specifications, with advice taken from other specialist consultants. Bills of quantities are usually drawn up by the quantity surveyor and an estimated cost produced once the design is complete.

Contractors are invited to price the works, quantifying every specific work item from the bills or a specification. Tenders are submitted and a preferred contractor (usually the cheapest) is selected. The contractor agrees to produce exactly what has been specified in the documents and therefore has no design liability.

Traditional contracting is a slow method of procurement as the detailed design and specification needs to be completed prior to tendering the works and a long tender period is required to accurately price the works.

Once on site, the employer with the project manager must manage the contract efficiently to avoid problems associated with issuing instructions and information. It is to the contractor’s advantage if information is insufficient or issued late, as this will establish grounds for extensions of time and claims for loss and expense.

Traditional contracting can provide a good level of cost certainty based on a defined product however, as the employer remains responsible for the design, any design defects have to be corrected at the employer’s expense.

Cost certainty can however only really be attained once the works have been tendered, which takes place once the design is substantially complete. Should the submitted tenders be significantly higher than the cost estimate prepared by the quantity surveyor, thus requiring a significant redesign to reduce costs, then there will be a substantial amount of abortive design and cost. This will also delay the project by many months.

Traditional contracting should deliver a quality building as the standards can be precisely described in the specification however, the designers may not be aware of similar more cost effective products which could help keep costs down without compromising quality and improve buildability.

Under a traditional contract, the client can change an element of the design during construction. However, as the employer will have to bear all direct and associated costs such flexibility comes at a high price.

The Employer is liable for any defects due to poor design and specification whilst the contractor is liable for defective construction.

A traditional procurement route is not recommended for this project as the residual risks cannot be transferred to the contractor, and time and cost certainty would be difficult to achieve.

Contractor
Procurement Routes

Management Contracting

In management contracting, the employer engages a management contractor at an early stage of the project to act as a professional consultant, advising on the design and managing the construction works. The management contractor is not employed to undertake any of the construction works, they are all sub-contracted. The client pays the contractor a fee for the management service.

Management contracting is claimed to reduce the conflict between the design team and contractors, which can occur on construction projects.

Under this form of contracting, the management contractor bears very little risk. The management contractor has no design responsibility and is usually not responsible for the work carried out by the sub-contractors.

Management contracting can deliver projects quickly as works can commence on site before the design is completed.

However, there is very little cost certainty in management contracting as it is impossible to be confident of the final project cost until all of the sub-contracts are entered into.

It should be possible to achieve the required quality standards, however, the designers will be under great pressure to keep pace with construction and design decisions may therefore suffer.

Construction management offers a great deal of flexibility for altering the construction works. However, all alterations to the works during construction are more expensive than if the design is right first time.

Liability for design defects usually remains with the employer and the sub-contractors are liable for construction defects.

Management contracting should only be considered if the employer is in a position to fully appreciate, control and mitigate the risks inherent in construction. This is very much the preserve of experienced developers, and the problems that blighted the Scottish Parliament demonstrate some of the downsides of this procurement route.

Management contracting is not therefore recommended for this project due to the lack of cost certainty and the limited opportunity to transfer risk.

Construction Management

Construction management is very similar to management contracting however with construction management the employer has a direct contract with each of the works sub-contractors. A consultant construction manager is employed by the employer to oversee the project and co-ordinate each of the contracts. Construction management provides flexibility in that additional works/changes to the brief can be introduced at an advanced stage however, the cost and programme implications of any changes will be born by the employer.

Construction management is not therefore recommended for this project.

Contractor
Procurement Routes

Partnering

Originally promoted in the Egan Report ('Rethinking Construction') in 1998, partnering was seen as a method of integrating the different facets of the project process to deliver best value to the client and user.

It aims to deliver this by ensuring that the full project team, including the contractor, act co-operatively and make decisions in a blame-free environment of trust. This seeks to raise the collective performance and aids more effective working, with a focus firmly on agreed common goals. It does this through setting parameters whereby all contracting parties work towards shared goals and objectives, and often share any penalties and/or rewards as a result.

The efficacy of partnering is most prominent when embracing the combined talents of the full project team (including client, design team and contractor) as early as possible. For partnering to work best, the team must therefore be in place from concept to completion and be wholly focused on the needs of the client and users.

There are clear benefits to a partnering approach where relationships have been built up over a period of time, and a mutual trust has developed, and many partnership arrangements have grown out of formal contractual arrangements.

Good examples would be a supermarket chain or housing association rolling out a fairly simple building type, whereby the contractor is incentivised to do a good job otherwise they would lose significant volumes of future work available from that organisation.

The other downside to partnering is that they rarely achieve best/lowest price or is a fixed price obtained any earlier than it would under other procurement routes. Partnering lends itself to a 'cost plus' arrangement (e.g. the actual cost of the work, plus the contractors pre-agreed overheads and profit) and is not best suited to a lump sum or fixed price contract. There is also limited opportunity to transfer risk to the contractor, and risk is often shared between the parties.

Partnering is not therefore recommended for this project.

Design and Build

In design and build, the employer provides the contractor with a set of performance requirements defining what is to be provided. The contractor responds with a proposal, including prices for construction and design works. The employer and contractor negotiate to ensure the contractor's proposals accurately reflect the employer's requirements and agree a mutually acceptable specification.

Under this form of contract, the contractor is solely responsible for design, fabrication and co-ordination of the works as described in the contractor's proposals, including the appointment of specialist consultants and sub-contractors.

The employer will usually utilise a consultant to prepare the employers requirements and to monitor the progress and quality of the works.

Under design and build, the contractor is responsible for all aspects of the work. This single point responsibility can be highly attractive and advantageous to employers.

Design and build has a time advantage as design work does not have to be completed before construction can begin. The development is therefore complete much sooner than under more traditional forms of contract.

Design and build offers high cost certainty as the contractor is obliged to do whatever is necessary to comply with the contractual requirements. All risk of the cost exceeding the price lies with the contractor and as a result design and build contracts offer the highest level of cost certainty. Tendered costs may be slightly higher than with other procurement routes in order to cover the contractor's liability or risk.

Cost certainty can be attained at an early stage in the design and abortive costs are therefore less should the contractor tenders be more than the cost estimate prepared by the cost consultant and a redesign required.

It is especially important to provide the design and build contractor with accurate information on site conditions and ecology at tender stage to avoid additional costs or delay.

Contractor
Procurement Routes

Quality control problems are often given as a reason for not selecting design and build. However, provided the employer's requirements document is sufficiently detailed and quality is closely monitored on site, it is possible to achieve a good quality building.

With design and build contracts, it is difficult to vary the works significantly once the contractor is appointed. Variations can be awkward to deal with and are best avoided. This can best be done by ensuring that an accurate and comprehensive employer's requirements document is prepared and agreed with all parties before the contract is let.

Develop and Construct

If the employer wants to be closely involved in the development of the concept design it is advisable to adopt an employer led design approach. The employer's design team works up the design in some detail, typically to RIBA Stage 3, to ensure that the brief can be met and that a unique design is achieved. The design team may subsequently be appointed by, or novated to, the successful design and build contractor. This procurement route is often referred to as 'Develop and Construct', as opposed to design and build, as the contractor is only required to carry out limited elements of the detailed design.

Develop and Construct allows changes in the brief to be integrated into the design for an extended period prior to tendering, which will be important where there are several key stakeholders and funders. Although changes post tender should ideally still be avoided. Essential changes may be accommodated without penalty if a disciplined change order procedure is adopted.

Develop and Construct has many of the advantages of design and build with regard to speed of design development, with the residual risks associated with shortcomings in the design and temporary works being transferred to the contractor. However, the design and quality of workmanship can be closely prescribed in order to achieve a fixed price tender from the successful contractor for a defined product.

A Develop and Construct procurement route is therefore recommended for this project, with the design being progressed to a more advanced stage, e.g. RIBA Stage 4 (previous RIBA Stage E).

Contractor
Tender Options

Single-stage tender

Single-stage tendering requires full and complete tender information to work most effectively, and assumes requirements will not change substantially. Thereafter, it relies upon the tendering process to drive competition and, hopefully, an economical price.

In a buoyant construction market, many contractors decline single-stage tenders – partly because it typically provides less visibility of risks or unknowns, and partly because it is more expensive to undertake than two-stage tendering.

Over the past couple of years, many of the larger contractors have been unwilling to tender on a single stage basis. However, we are starting to see a slight shift in this as they look to secure their forward orders, and a single stage approach could be appropriate.

To successfully pursue this route, clear and comprehensive tender information, an effective market warm-up and mid-tender consultations are pre-requisites. Soft market testing with key contractors is also recommended.

Two-stage tender

Two-stage tendering provides an opportunity to capture contractors' ideas in buildability, programming and design, and is particularly relevant for complex projects.

There is competition in the first stage of procurement, where staff, overheads and profit, preliminaries and even some early packages are fixed.

Once the design has been progressed in detail and major packages of work procured, the second-stage fixed price, guaranteed maximum price (GMP) or target price can be agreed.

It is often perceived as being a more expensive option than single-stage (albeit difficult to quantify), but the premium can be often recovered through a more cost-effective design and enhanced programme following the contractor's input. This option is not without its challenges, however.

Although overhead, profits and prelims are fixed, and the work packages procured on an open-book basis, the contractor will include contingencies for design development and project risks, often amounting to 10% or more of the contract sum. As these provisions are negotiated during the second stage, they are not typically subject to market competition and can involve extensive negotiations, which can increase both cost and programme.

To make best use of a two stage tender, the contractor should be brought on board as early as possible so they can input into the design development and risk mitigation, and maximise the benefit of early contractor involvement on buildability issues.

Given the current market conditions in the construction industry, the complexity of the project, the project location, and the Council's priority for a high quality product, we recommend that a two stage tender basis is used. This will generate an appropriate level of contractor interest, whilst also gaining from the benefit of early contractor involvement on buildability issues.

Form of Contract

The form of contract is one of the final outputs of the procurement planning process, and can only be considered in the context of all previous stages. For example, some frameworks stipulate specific contracts are used.

We do however anticipate using either a JCT or NEC form of contract. This would be amended by the Council and their legal advisors, with input from the consultant team on project specific matters.

The scope of service to be provided under a Pre-Construction Services Agreement (PCSA) will also be important if a two stage approach is adopted.

Contractor Procurement Route Summary

Route	Pros	Cons	OJEU	Framework
Traditional	• Complete control over design and product selection. • Reduction in post contract changes.	• Longest lead time before starting on site, therefore longer overall programme. • Design risk sits with client. • No price certainty until much later in project. • No sub-contractor input. • No incentive for contractors to solve problems. • Rarely used for this type of project.	• Yes. • OJEU 'Restricted' route.	• No. This approach is rarely used under framework agreements.
Management Contracting / Construction Management	• Client retains full control of the project. • Design and construction overlapped, reducing overall programme. • Flexibility to make changes. • Open book approach.	• Client unable to transfer design and project risks. • Increased contract management. • No price certainty until very late in the construction phase. • Very resource intensive for Client team. • More suited to large complex projects.	• Unlikely an individual package will be over OJEU threshold.	• No.
Partnering	• Least adversarial. • Open book approach. • Early contractor input on buildability issues. • Should achieve a high quality product.	• More costly. • Client unable to transfer design and project risks. • No price certainty until end of construction phase. • Not suited to one off projects where there is little opportunity to benefit from long term relationship.	• Yes, but not ideal.	• No. Although some frameworks do introduce an element of partnering.
Single stage Design & Build	• More likely to achieve lowest price. • Early cost certainty. • Contractor takes on design liability. • Risk transfer to the contractor. • Design and construction can be overlapped reducing the overall programme. • Client can choose extent of design carried out prior to commencing on site.	• Loss of control over product selection (this depends on the level of design carried out prior to tender and how detailed the Employer's Requirements are). • Post contract changes often more expensive. • Quality can suffer (this depends on the completeness of the design and Employer's Requirements and how well the construction phase is monitored). • Contractors are less willing to participate in a single stage tender in a buoyant market, particularly the bigger contractors that would be more appropriate for this project.	• Yes. • OJEU 'Restricted' route. • Note that some legal advisors are advising that the OJEU process can't be started until planning has been granted and the final tender documents are available.	• Not usually. A single stage procurement route is not suited to a framework agreement.
Two stage Design & Build	• Can achieve a reduced programme over singe stage as design and tender stages can be overlapped to a greater extent. • Early contractor involvement where buildability is important. • More likely to receive a quality product as the contractor margins aren't as tight. • Contractors more willing to tender this route in a buoyant construction market.	• More expensive than single stage due to reduced competition. In our experience it is 7.5%-10% more expensive. • Conclusion of second stage tender can be protracted. • Loss of control over product selection (this depends on the level of design carried out prior to tender and how detailed the Employer's Requirements are). • Post contract changes often more expensive.	• Yes. • OJEU 'Restricted' route is normally used, although some legal advisors will advise that a two stage approach isn't strictly OJEU compliant.	• Yes. A two stage procurement route is ideally suited to a two stage procurement route.

Contractor
Commercial Basis

Below set out are three commercial approaches to pricing, each of which has advantages and disadvantages:

Basis	Advantages	Disadvantages
Fixed Price	• High level of cost certainty. • Clear basis for risk transfer. • Most effective where design and client requirements are fully detailed.	• Fixed price doesn't mean final price – changes and/or risk can add to costs. • No mechanism for sharing savings. • Requires full and complete information for competitive pricing. • Change can be more expensive.
Guaranteed Maximum Price (savings shared in agreed %'s)	• Good level of cost certainty. • Contractor can be incentivised to find savings. • Opportunity for client to share savings.	• Contractor is only motivated to find savings if GMP has some premium in it. • GMP doesn't always mean maximum price – changes and/or risks can add to costs. • Contractor may be resistant to changes which could impact price or programme.
Target Cost / Shared Risk and Reward (savings and overspend shared in agreed %'s)	• Equitable risk sharing incentivises contractor, so more willing to find cost-effective solutions. • Opportunity for client to share savings. • Least expensive route for change.	• Lower level of cost certainty. • Risk of shared cost over-runs. • More client involvement required to drive value. • Clarity needed on risk transfer.

Given the continuing rise in construction activity and the extensive evidence of price inflation, these conditions limit the ability of clients to obtain fixed-price tenders on a single stage basis with contractors seeking to reduce risks and are therefore being selective with regard to which projects they bid. However, this is more viable via two stage tender process.

For this project, we would recommend that a fixed price approach is adopted. This will provide the Council with a higher degree of cost certainty.

Hadron Consulting

Contractor
Frameworks

Contractor Frameworks.

There are a number of national and regional contractor frameworks which are shown in the adjacent graphic.

Although, in theory, it is possible for the Council to access any of these frameworks, it is common practice for them the be chosen on location was the framework for that region will be most relevant with regard to the selection criteria and KPI's.

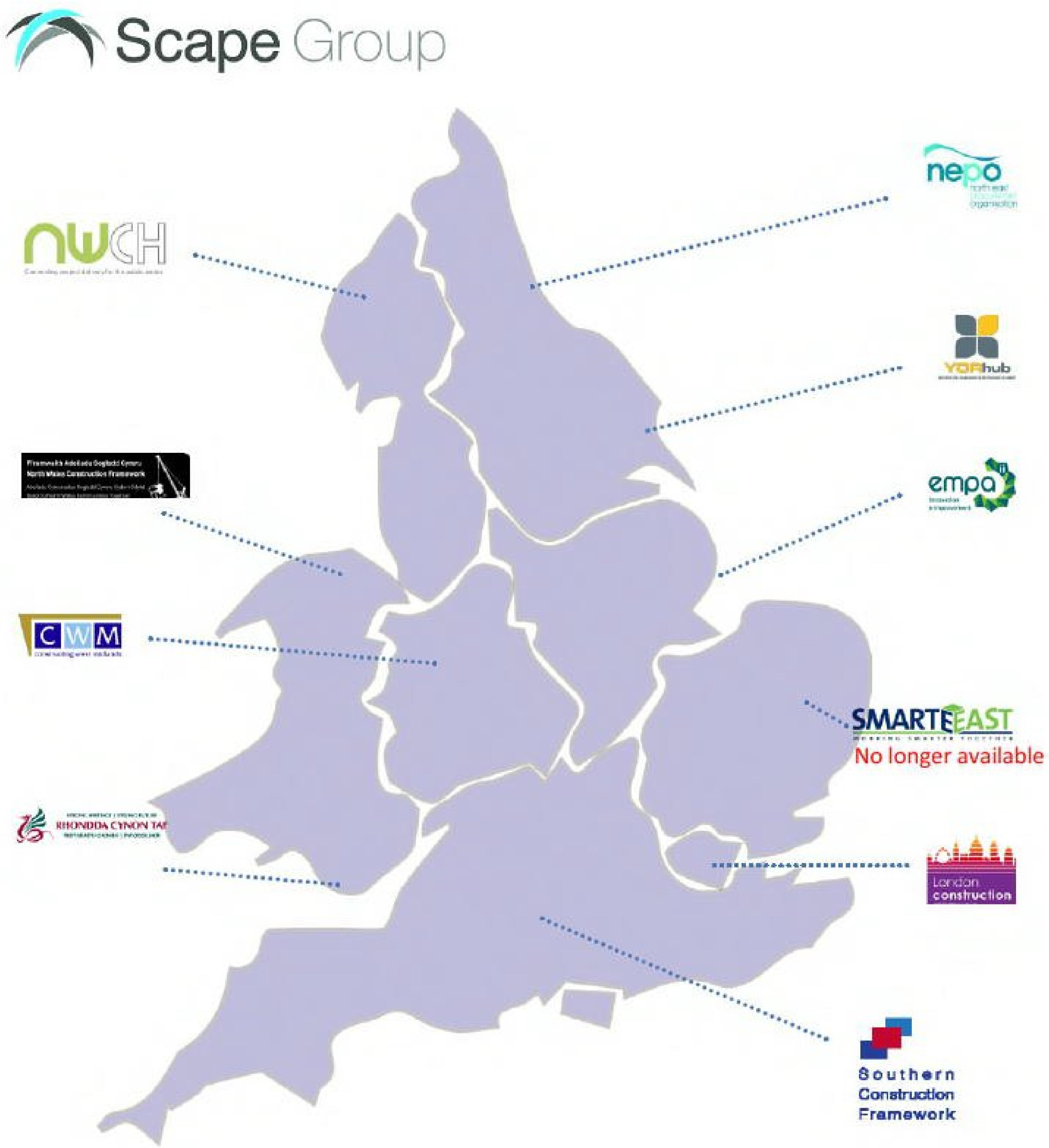
The most relevant regional framework for the Council is therefore the **Southern Construction Framework**, and specifically the South East region.

The other framework the Council could make use of is the **Scape Framework**, which is a national framework.

The main benefits of using a framework are:

- Avoids the need to OJEU the project, as the framework has been put in place using the OJEU procedures. This is becoming ever more desirable in a climate where contractors are more likely to challenge the decision where they have not been selected. This also reduces the overall programme and management costs.
- A contractor can be appointed much quicker. This is particularly relevant where buildability will be key due to the iconic nature of the scheme and the constrained city centre location.
- A framework can be selected that includes contractors with a track record of delivering similar projects.
- Frameworks include KPI's that the contractors are assessed against, which incentivises them to perform well. This is particularly important where a one off project is being delivered. KPI's also incentivise the contractor to use local labour and suppliers.

Whilst Frameworks can be used for single stage procurement routes, they are best suited to a two stage design and build procurement route.



Contractor
Framework Overview

We have summarised the most appropriate OJEU compliant frameworks for this project below. These are best suited to a two stage procurement route. Further information on each framework can be found in the Appendices.

Framework	Areas Covered	Companies on Framework	Comment
Southern Construction Framework (SCF) Lot 2 - South East	South East England	BAM Kier Morgan Sindall GallifordTry Mace Wates Willmott Dixon Midas	Framework is relatively new, going live on 29 April 2015. This replaces the previous arrangements covering the South East and London area (SEaL) and Construction Framework South Wet (CFSW). This Framework is set up in a similar way to the Scape Framework, albeit there is more than one contractor on the Framework. A mini-competition is used to select preferred contractor, and it can take a little as three weeks to select the contractor. Choice of JCT and NEC contracts.
Scape	Set up initially to be an East Midlands framework, although it is used nationality.	Minor Works Framework (Up to £2m) - Kier Major Works Framework (+£2m) - Willmott Dixon.	Only one contractor on this framework for each project value range, and therefore no competition. Procured in a very competitive construction market and the contractor overhead, profit and prelim rate is low in comparison to rates currently being seen in the open market. Current Major Works Framework is due to expire 8 May 2017. Willmott Dixon have a good track record of delivering leisure facilities. Based on the NEC contract.

Contractor
Scape Framework

Scape is a contracting authority in its own right, comprised of six local authority shareholders, with the agreed aim to procure services and works packages in an efficient and timely manner. The current framework is national with an annual spend of around £350m across all industry sectors.

The Scape framework has been used to deliver public sector projects for around 10 years. The currently framework has a four-year cycle, which ends in May 2017.

Kier is appointed as the sole principal contractor under this framework for projects up to £2m, and Wilmott Dixon for projects above £2m. This was intentional, as Scape wanted to avoid replication of works and services to draw efficiencies in tendering costs and programme.

Scape is effectively an 'open book' two stage procurement route, with a 'target cost' being agreed at the first stage along with the contractor's overheads and profits, plus the design costs (and other associated costs) to develop the design prior to entering into the building contract.

The claimed benefits of using the Scape Framework are:

- Process. The framework has an easy and flexible process map, which can be adapted to suit all procurement routes.
- Cost. The majority of costs are open book, market tested.
- Quality. The framework has improvement & employment skills targets in place, which are monitored by Scape on a "Three strikes and you're out!" basis.
- Accountability. A single point of contact / project manager is provided to ensure effective communication and management of responsibilities.
- Fixed price, guaranteed maximum price (GMP) or target price can be agreed.
- Buildability. Experienced construction staff and planning manager assist with buildability, phasing, risk management, planning, programmes, highways etc.
- Managing Cost. The senior estimator and quantity surveyor along with their supply chain manager will assist the project team with live up to date advice to ensure accuracy at all stages.
- Design Quality. The contractor's senior design coordinator Introduces suppliers and subcontractors into the design process as required.

Willmott Dixon's profits and overheads are currently fixed at 3.5% under the Scape framework agreement, plus an additional payment to Scape, which is typically 0.5% (using a sliding scale fee by floor area) which Willmott Dixon pay to Scape. By way of comparison, the overheads and profit for a leisure centre in the current market can be anything between 1.5% - 7%.

One of the aims of the framework is to achieve efficiencies through shared learning and repetitive design, procurement and construction solutions, which will help build collaboration in the team.

The framework provider has contract documentation that is pre-agreed with the contractor. This should result in lower legal fees for the client team so that the programme and each project can proceed in the knowledge that legal agreements will not cause delay.

In our view, there are some drawbacks with the Scape framework:

- In our experience it can cost more to procure works through the Scape framework due to the lack of competition and the contractor's reluctance to take on risk without incurring a premium.
- There are no real programme benefits of using the Scape framework as it often takes longer to conclude the second stage.
- The contractor is less likely to agree a tight programme as one of their KPIs is delivery against programme. Whereas contractors are more likely to agree to a more ambitious programme where they are tendered in competition.
- Sport England aren't particularly keen on the Scape Framework due to the lack of competition.

For the above reasons, we do not recommend that the Scape Framework is used.

Contractor
Southern Construction Framework

The Southern Construction (SC) Framework can be used by local authorities, public sector bodies and charities across Greater London, the South East and South West of England. It covers individual projects or programmes. The framework went live 29 April 2015.

The Framework follows the principles and practice of the previous Construction Framework South West and South East and London Area frameworks, as well as the Government Construction Strategy (2011), the industrial Strategy for Construction (Construction 2025), and is based on a Two Stage Open Book approach.

The claimed benefits of using the SC Framework are:

- Fast access to market – considerably quicker than full tendering
- Proven – the first construction framework, now established for ten years
- Certainty – high levels of time and cost predictability
- Competitive process – delivers value
- Locally focused / adaptable to local requirements
- Shared best practice across suppliers
- Contractor led continuous improvement
- OJEU compliant

Contractors are appointed via a 2 part mini competition process. This is based on quality and fee bids for a pre-construction agreement appointment.

Contractors have priced Overhead and Profit (OHP), pre-construction fee, design fees, and construction staff costs on a not to exceed percentage basis for a range of project types and sizes as part of the framework.

Mini Competition Part 1 establishes the type, value, and form of contract. This section forms the specification for the Services to be provided by the contractor during the pre-construction phase. The contractor self scores a number of questions with supporting evidence of their availability, suitability and ability to add value to the project. Typically three contractors are invited to complete Mini Competition Part 2.

The second part Mini Competition 2 tests the contractors' financial response, and provides an opportunity to demonstrate to the Client that they provide the 'best fit' to deliver the project.

The contractor will be paid a fee for pre-construction stage duties which is governed by a Pre-construction-stage agreement. The contractor will then work collaboratively in an open book environment with the Client team to develop the design and provide an acceptable tender for the works before being awarded a Construction Agreement for delivery of the project.

The SC Framework is similar to the Scape Framework in many ways, with broadly similar rates. However, the main difference is that there is more than one contractor on the framework, and there is therefore an element of competition to the first stage where the contractor is selected. For this reason, we recommend that this framework be used.

It should however be noted that same challenges existing when trying to conclude the second stage when the contractor is no longer in competition, and this will require careful management by the appointed cost consultant to ensure best value is obtained.

Contractor
Southern Construction Framework

Soft Market Testing

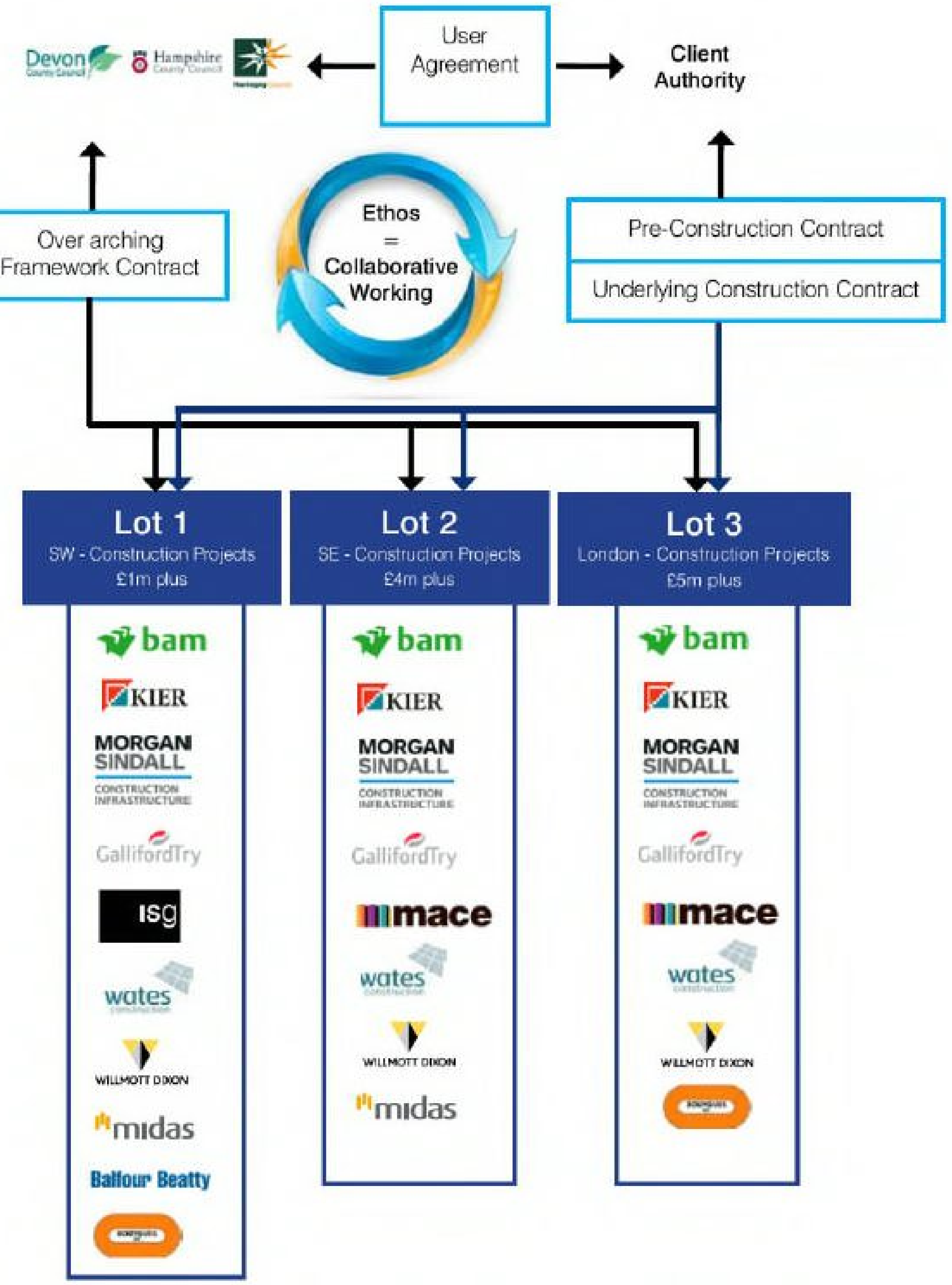
One of the outcomes from the Procurement Workshop was to approach the contractors on the SC Framework to establish the level of interest in the project.

A background document was issued to the contractors via the framework manager to provide an overview of the project. This included the following project information:

- Overview of work completed to date
- Proposed facility mix
- Estimated capital costs
- Initial floor plans designs and area schedule
- Procurement route
- Indicative programme

[redacted]

This therefore supports the recommendation to use the Southern Construction Framework.



Contractor
OJEU

The current OJEU threshold for construction works is £4,104,3942 (as of 1 January 2016).

There are four possible OJEU routes that can be used to tender projects: Open; Restricted; Competitive Dialogue; Competitive Negotiation procedures; and Innovation Partnership.

For a project of this nature the most suitable route used to be the Restricted procedure, and the tender process was run in parallel with the design development, so that no time is lost on the overall programme. However, The Public Contracts Regulations 2015 have left ambiguity on this matter, inferring that all procurement documents must be accessible when the OJEU notice is posted.

By taking a cautious interpretation of the regulations in respect of the procurement documents, these would need to be available to contractors in their entirety at the Pre Qualification Questionnaire stage. This would have a significant impact on the delivery date for the project. This would also diminish the benefits of using a more orthodox two stage approach when the contractor would be appointed under a Pre-Construction Services Agreement prior to the design and project requirements having being fully defined.

The Competitive Negotiation procedures are therefore being seen as an alternative, which enables the OJEU process to commence in parallel with the design development. It is however important that the approach to be adopted and shortlisting / down-section of contractors is clearly set out, along with any negotiation points.

The Open procedure invites an unlimited number of interested parties to tender against defined parameters. This is not normally recommended for construction projects as the number of tenders received can inhibit a timely appointment of the contractor. In addition to this, there will also be certain contractors who will not bid under this procedure as the likelihood of appointment is diminished due to the number of bidders.

The Competitive Dialogue procedure is a much more involved process and is best suited to complex development projects where the bidders will be required to develop a design as part of their proposals, and the design is refined, along with the financial proposals, through dialogue with the client.

If the OJEU procedure is adopted, a Project Information Memorandum (PIM) which provides the project background, and a Pre-Qualification Questionnaire (PQQ) would be issued upon request. The contractors would be required to provide information in response to the PQQ including the following:

- Company information – size, location.
- Financial information – audited accounts, ability to provide a performance bond, Dunn and Bradstreet credit rating.
- Insurance details – including Professional Indemnity.
- Project team – experience of the team, track record, proposed sub-contractors.
- Experience – track record, working with public bodies, experience of procurement route.
- Health and Safety – health and safety policy, track record, ability to act as the Principal Contractor.
- Regulatory issues – Regulation 14 of the Public Works Contract Act 1991.

If an OJEU procedure is used we would recommend that a maximum of five contractors be shortlisted to tender from the expressions of interest received in response to the OJEU notice (this is also the minimum allowed). In our experience, contractors are not prepared to commit significant resource and cost to prepare a tender if more than five contractors have been asked to tender for the works. This approach is in line with OJEU procurement rules.

Contractor
OJEU

The tender procedure would be in accordance with the Council's procurement regulations and will follow the Code of Procedure for Selective Tendering for Design and Build published by the NJCC.

Shortlisted tenderers would be invited to mid-tender meetings at which they can seek clarification of the client's requirements and discuss the priorities and critical objectives. Responses to contractor's questions would be circulated to each of the contractors tendering. This would also give the Council an opportunity to meet the individuals who will be responsible for delivering the construction of the project.

A contractor would be appointed on the basis of them scoring the highest overall tender score based on both quality and cost criteria, and the other tenderers would be notified accordingly.

The whole process can take four months to finally appoint a contractor. This approach is not therefore suited to a two-stage procurement route, as the benefits of involving a contractor early are not realised, although it could technically still be used.

Using the OJEU procedure also carries a higher risk of challenge from unsuccessful contractors compared to frameworks. This is in part due to the costs associated with responding to an OJEU tender. Additionally, a contractor is less likely to jeopardise their standing in a framework.

For these reasons we would not recommend that the OJEU procedure is used to procure the contractor for this project.

Recommendations

To summarise we consider the following to be the most appropriate procurement approach for the Dover leisure Centre:

Approach	Reasons
Contractor and operators to be procured separately. This will discount a DBOM, DBFO and Asset Transfer approach.	• To maximise competition and meet the project programme.
A two stage develop and construct procurement route to be adopted.	• Programme – to achieve completion by the end of 2018. • Early contractor involvement. • More attractive in the current tender market. • Collaboration with contractor to obtain high quality product. • Risk transfer where appropriate.
Design developed to Stage 4 (previously Stage E) in conjunction with the contractor and for the completion of the second stage tender.	• Ensure a high quality product is obtained. • To enable a fixed price to be obtained for the works on completion of the second stage tender.
A fixed lump sum price is obtained for the works.	• Obtain cost certainty before starting on site. • Risk transfer where appropriate.
Key designers, e.g. architect and civil/structural engineer would be appointed by/novated to the contractor to complete the design.	• Continuity of design. • Programme – to avoid downtime whilst a new team get up to speed. • Obtain a high quality product. • Transfer design risk to the contractor.
The contractor is procured through the Southern Construction Framework.	• OJEU compliant. • Avoids full OJEU process and associated programme impact. • Mini-competition to select contractor. • National contractors with relevant experience on the framework. • Bring on board a contractor at an early stage to work with the Council and the Design Team, and advise on, programme, buildability, cost, etc.

Appendix A
Contractor Framework Information

Appendix B
Consultant Framework Information

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