SPECIFIC NOTES

(To be read in conjunction with all Engineers Drawings and Specifications)

A. GENERAL

1. Reference herein to Irish Building Regulations, British, Eurocode or other National Standard or Codes of Practice do not give the year of issue or dates of Amendments. The latest relevant published version including any relevant amendments and addendum at the date of invitation to tender shall apply. Where a Standard or Code of Practice has been superseded, the latest edition of the superseding publication shall apply. All Designs, Materials and Workmanship shall comply with the relevant Eurocodes (I.S. EN Ref's), EU Standard's Code of Practise or Equivalent Irish Standards or Codes or Practise.
   Where Eurocodes are used, the referred National Annex to each respective EN shall be considered. Where no Eurocode, EU Standard or Irish Standard exists, compliance shall be obtained through relevant British or other Internationally recognized Standard or Good Industry Standard. In each case, the relevant standards or Codes of Practise which are the most current and appropriate at the time the relevant obligation is to be performed shall be applied.
2. The contractor shall comply with the Building Control Amendment Regulations 2014 (BCAR)
   - An Inspection Notification Framework (INF) shall be developed with the Assigned Certifier and design team based on the Preliminary Inspection Plan (PIP)
   - The contractor shall comply with the Code of Practice for Inspection and Certifying Buildings and Works (as published by the Minister with reference to Article 20G of the Building Control Regulations)
   - As required under the contract documents the contractor shall appoint competent and suitably experienced Specialist Designers. The Specialist Designers shall complete the specialist designer forms at commencement and completion stage as required by the Assigned Certifier under the BCAR. The Specialist Designer shall provide evidence of PI insurance appropriate for the work being undertaken and the value of the contract.
3. This drawing and all other drawings shall be read in conjunction with all the Architectural and Engineering drawings and all other relevant drawing and specifications. Where conflict occurs between drawings and Engineers project G.A. and detail drawings, the project GA and detail drawings will take precedence over the notes on this drawing. For all other situations contact the engineer.
4. All dimensions are in mm unless noted otherwise. All levels are in metres Above Ordnance Datum, unless noted otherwise (refer to Architects drawings) indicating structural slab level (SSL) or top of steel (TOS).
5. DO NOT SCALE FROM THE DRAWINGS, work to figured dimensions only. Any discrepancies in dimensions are to be referred to the Structural Engineer before work is put in hand.
6. The CONTRACTOR referred to in all notes shall apply to the Main Contractor or his appointed Sub-contractors.
7. For Refurbishment Projects (where applicable) an evaluation has been made of the relationship of the new construction above the existing and its effect upon the capacity of the retained parts. Allowances have been included in the tender documents. Before any new construction commences the Contractor is to set out the new grids on site as shown on the Architect's setting out drawing. With this information an accurate survey of the existing building is to be carried out to establish its relationship to the new grids. The methods for implementing this survey is to be submitted and agreed with the Architect and Structural Engineer. It should be noted that pilot holes may be necessary to assist in the surveying of the structure, particularly columns and perimeter beams. All relevant details are to be recorded and copied to the Structural Engineer so that a comparison with the initial evaluation can be made.
8. Holes or openings through any slabs, walls, columns, beams or steelwork are not to be made without the permission of the Structural Engineer.
9. The Contractor must ensure that all the Sub-contractors are aware of their responsibilities to the project, particularly at any interface details.
10. The Contractor is to provide details of all temporary works required by the building method and submit them for review by the Structural Engineer prior to commencement of works and allow the structural engineer sufficient time to carry out the review.
11. The provision of any crane/hoist bases that the Contractor requires are to be designed using independent bases that are sited clear of any existing structure. Design by the Contractor to be reviewed by the Engineer.
12. All builder's work details and locations shown are indicative only. Unless noted otherwise for construction the Contractor shall refer to the Service Engineers/Specialist drawings for all builders work details and locations related to holes, services, manholes, sumps and drainage. Any discrepancies between drawings to be brought to the attention of the Engineer prior to carrying out the work.
13. The Contractor is responsible for locating all existing services (electricity, telecommunications, gas, water, drainage etc.) prior to any works commencing. Details to be sent to the structural engineer prior to building work commencing.
14. Fire ratings to structural steel and composite slab on metal decking to be as defined by the Architects specifications and drawings.
15. For all cladding details refer to Architects or Specialists drawings.
16. For partition restraints and fixing details see Architects drawings.
17. For cast-in inserts see Architects and Specialists drawings together with Engineers details (where appropriate).
18. All loadings used by specialist sub-contractor designers are to be in accordance with I.S. EN 1991, parts 1-1 to 1-7 inclusive and OCSC Project GA's.
19. All works shall be carried out in a safe manner and in accordance with the Health and Safety Regulations. Method Statements (where required) shall be submitted to the Engineer or other appointed person(s).
20. The Contractor shall comply with all Statutory Authority requirements including Planning Conditions, Disability Access Certificate, Fire Safety Certificate Conditions, Local Authority drainage requirements etc.
21. Fully detailed dilapidation and photographic survey on existing and adjoining properties, roads, footpaths,services etc. shall be carried out by the Contractor and submitted to the Engineer and any adjoining owners/representatives or other relevant parties. Dilapidation survey to include properties in the ownership of the client. Liaison with adjoining owners to be carried out by the Contractor. The main Contractor shall monitor any distress noted on adjoining structures etc. using an approved method i.e. tell-tales or similar.
22. Concrete drying times: the Contractor is responsible for coordinating and providing any additional curing/ protection requirements necessary for screed or concrete pours, e.g. liquid applied damp proof membranes etc to complete floor finishes within the contract programme.
23. Unless otherwise noted suspended slabs are not designed for construction access loading above 1.5kN/m². Construction traffic or material storage that exceeds the design live load capacity shall be back propped by the Contractor. The Contractor is responsible for the design and the installation of all temporary propping and is to employ a specialist temporary works sub contractor with profesional indemnity insurance.
24. The civil and structural design is based on the premise that the Contractor only employs personnel that are competent and qualified for the tasks they undertake.
25. The Contractor's attention is brought to the risks and hazards outlined in the Preliminary Health and Safety Plan and Designers Assessment of Risk Forms.
26. All existing sewers are to be inspected by closed circuit television (C.C.T.V.) so as to record their structural service and construction condition. The speed of the camera in the sewer shall be limited to 0.10m/s for diameter less than 200mm, 0.15m/s for diameters exceeding 200mm but not exceeding 300mm and 0.20m/s for diameters exceeding 300mm. Survey information is to be accurately plotted on the topographical survey in dwg format showing all manhole cover and invert levels, direction of flow and sewer falls. On completion of the works the Contractor is to carry out a C.C.T.V. survey of all newly constructed sewers with repairs/ blockages rectified at no cost to the client.
27. An interpretive report of the C.C.T.V. survey and DVD(s) is to be submitted within 2 weeks of completing the work. The interpretive report should give a commentary on the structural condition of the culvert or pipework in accordance with the UK Water Research Council (WRC) together with recommendations for any remedial works required (if any). Defects should be graded on a scale of 1 to 5 in accordance with the grading system outlined by the WRC on the schedule. C.C.T.V. operators and supervisors must be familiar with the UK Water Research Council publication 'Manual of Sewer Condition Classification'.
28. In the case of blockages or excess detritus deposits in sewers, permission must be sought from the Engineer prior to clearing so to use an appropriate technique to clear the blockage or detritus with advance permission and cost approval required in advance of any setting.
29. If it is reasonably foreseeable that asbestos containing materials (ACM) may be present the Contractor shall obtain the services of a competent specialist to carry out a survey with risk assessment report prior to any demolition or refurbishment works being undertaken.
30. All new drainage under public roads and footpaths is to be constructed in accordance with "taken in charge" standards /adoptable standards as per the local authority requirements.
31. The Contractor is to review all proposed drainage to existing manholes prior to commencement of the works. Any alterations to existing manholes are to be included in the Contractors tender i.e. re-benching of manholes, modifications to access ladders, manhole covers etc.
32. Refer to arch's drawings for all insulation, dpm's, radon barrier & sumps. All penetrations through the ground floor slab are to be sealed using proprietary top hat sections bonded to the radon barrier.

REVIEW OF SPECIALIST DESIGN INFORMATION

When reviewing third party specialist design drawings and submittals the following status system will apply:

STATUS	
A	NO COMMENT
B	AMEND AS NOTED
C	AMEND & RESUBMIT
D	NO CIVIL OR STRUCTURAL CONTENT

- For OCSC review of specialist design & detailing information, design & detailing responsibility remains with the specialist subcontractor or supplier as applicable irrespective of the above status references.
- Comments by OCSC does not absolve the specialist subcontractor from correctness of design/detailing & fit of components etc.
- All dimensions and levels are to architects approval and shall be confirmed by contractors site measurement.

B. DEMOLITION

1. All demolition works to be in accordance with Engineers and Architects relevant specifications and drawings, British Standards (BS 6187: Code of Practice for Full and Partial Demolition) and general good practice.
2. The Contractor to make reference to the original Architects or other drawings where available (a typical selection of drawings will be enclosed with the tender package). The Contractor must verify all details on site.
3. The Contractor shall ensure that he protects the integrity of the existing building and in particular any retained sublet space.
4. The Contractor is to provide details and calculations of all temporary works required by the demolition method and submit them in good time for review by the Structural Engineer. The Contractor must allow a minimum of 10 working days for this review to be conducted. All temporary works shall be the responsibility of the Contractor.
5. Where noted on the drawings, the existing concrete is to be cut back to the line shown. The integrity of the remaining concrete must be maintained as well as corrosion/fire protection to any exposed re-bars.
6. The Contractor shall provide with his tender return, the outline principles and detail of the method of demolition which shall be used in the review for selection of the successful Contractor. The method shall ensure that the demolition is effective and efficient and will not lead to remedial works at a later date. Any remedial works required due to the Contractors operations shall be at no cost to the Client.
7. A fully detailed dilapidation and photographic survey on existing and adjoining properties, roads, footpaths, services etc. shall be carried out by the Contractor and submitted to the Engineer and any adjoining owners/representatives or other relevant parties. Dilapidation survey to include properties in the ownership of the client. Liaison with adjoining owners to be carried out by the Contractor. The main Contractor shall
   monitor any distress noted on adjoining structures etc. using an approved method i.e. movement monitoring devices or similar.
8. The Contractor is responsible for locating all existing services (electricity, telecommunications, gas, water, drainage etc) prior to any works commencing. On completion of the project, the contractor shall carry out a full CCTV survey of all retained and new services.
9. The Contractor shall allow for the installation of vibration monitors complete with audio and visual high level alarms. No vibrations exceeding 3mm/s PPV will be permitted. The number and location of vibration monitors are to be submitted to Engineer for comment prior to construction.
10. The Contractor shall notify the Engineer of any Ordnance Survey bench marks found in the vicinity of property scheduled for demolition.

C. GROUNDWORKS

1. The contractor is to refer to the site investigation report for details of ground conditions (incl. water levels), existing obstructions and ground contamination.
2. The Contractor is to refer to Specifications on Excavation and Loose Fill Work Specification, Site Development Work Specification and relevant Eurocode, Irish and/or British standards for new groundwork details.
3. The Contractor is to submit a method statement for excavation and construction of the foundations with his tender to review conformity with Design Drawings & Geotechnical reports. No additional costs will be entertained if not submitted.
4. The Engineer is to be informed immediately of any old sewers, drains, foundations etc. discovered other than those already noted.
5. The excavations shall be kept free from water by pumping, bailing or other approved means. The Contractor's method of keeping excavations free from groundwater is to be submitted to the Engineer for review. The Contractor is responsible for agreeing ground water discharge with the local authority including obtaining any discharge licences required. The Contractor is to monitor the external water table to ensure it is not adversely lowered so as to cause damage to third party property.
6. Filling other than with concrete shall be carried out in layers not exceeding 225mm in depth before compaction, and each layer shall be thoroughly compacted before the next layer is placed. The Contractor is to exercise care in filling behind retaining walls so as to ensure that loads do not come on the wall for which it was not designed or in a manner for which it was not designed. Granular fill to comply with SR 21:2004+A1:2007 and in particular Section 3.4 and Annex E. For further details refer to "Concrete floor at grade and concrete footpaths/specification for filling" of this document.
7. The Contractor shall notify the Engineer immediately if any areas of soft or unsuitable material are encountered.
8. All soft spots/overdig below formation for foundations are to be backfilled with C16/20 concrete (in accordance with I.S. EN 206-1 Table 7) max aggregate size of 20mm u.n.o.
9. The Engineer and Local Authority (if applicable) are to be given ample opportunity to inspect formation levels and temporary surfaces which are to be protected from deterioration. No concrete shall be placed on frost, ice, water or unapproved/unacceptable ground.
10. The Contractor is responsible for the location and protection of all new and existing services and shall be liable for any damage arising as a consequence of the works. He shall allow in his programme for the requirements of the local authority/ electricity provider/natural gas provider/utility companies and shall make all necessary arrangements. All existing services beneath proposed pad and strip footings are to be diverted prior to the commencement of the foundation works.

D. PILING

1. All piling works to be in accordance with all relevant specifications and all relevant Eurocodes, Irish or British Standards together with the ICE Publication "Specification for piling and embedded retaining walls".
2. 2All piling works to be in accordance with the Engineers Piling Specification (u.n.o. elsewhere).
3. All piles shall be as indicated on the Engineers drawings to design by Specialist Piling Contractor in accordance with loads indicated and should be referenced by their pile number.
4. The piling designer shall clearly state the criteria used in the design and supply 2 copies of design calculations to the Engineer at tender stage.
5. Pile testing shall be as indicated on the project GA drawings in accordance with OCSC Technical specifications. The costs for all necessary testing shall be deemed to be included in the tender price.
6. Static load-testing to 2.5 SWL on a preliminary sacrificial non-working pile shall be agreed with the Engineer.
7. Static load-testing to 1.5 SWL on working piles shall be chosen by the Engineer in conjunction with piling (driving/boring) records.
8. Continuous vibration monitoring on existing/adjoining structures shall be carried out by the Piling Contractor in conjunction with the Engineer and/or adjoining owners representatives. Details of this monitoring shall be supplied to all relevant parties within 3 working days of completion of testing.
   Vibration limits (u.n.o.)
   (i) 3mm/sec PPV for historic/listed/sensitive/dilapidated structures
   (ii) 5mm/sec PPV for modern structures in good condition
9. The piling contractor is to review the site investigation report prior to tender price submittal and confirm acceptance that the extent of investigation is adequate for pile design on the project site. If the pile contractor requires further site investigation to confirm his design then this additional investigation should be allowed for in the piling contractor's tender price and ensure this investigation can be carried out within and complies with the main contractor's works schedule/programme.
10. At least 15% of the total number of piles shall have a dynamic test carried out by a specialist independent testing company. This shall apply to all driven and bored (mini-piles). One of these piles shall also include the sacrificial pile used for the static load test.
11. All bored piles shall be integrity tested unless otherwise agreed with the Engineer.
12. The piling contractor shall inform the main Contractor on programme implications due to testing. Every effort shall be made to carry out all testing on piles as early as possible in order to mitigate delays and gain confidence in the piling operations. All static load testing shall be completed prior to the piling rig departing on site.
13. Reinforcement contained within piles shall be fully anchored (tension) into pile caps/ground beams. Sufficient reinforcement shall project from the piles (after breaking down) to achieve full tension anchorage. Unless otherwise noted on the GA drawings all piles are to be embedded 75mm into pile caps/ ground beams.
14. The Piling Contractor is advised to visit the site and familiarise themselves with the site constraints. Having become familiar with all the constraints, the piling sub-contractor shall review their proposals (pile types, vibration limits etc). to ensure conformity with these constraints.
15. Piling platform design and specification is the responsibility of the Piling Contractor.
16. The Contractor shall provide the Engineer with an AutoCAD survey drawing showing as-built pile positions.

E. BASEMENT CONSTRUCTION

1. The Contractor shall not take for granted that working space outside of the site boundary will be available for use unless expressly approved in writing from the Architect.
2. All retaining concrete below ground required to prevent ingress of water or to contain aqueous liquids shall be watertight concrete in accordance with the Engineers 'Cast In-situ Concrete' Specification.
3. Where water bars or water proof membranes are indicated on the Engineers drawings, they shall also be read in conjunction with the Architects details/drawings. Water bars shall be located at all construction joints. Water proof membranes if specified to the basement slab and retaining walls shall be installed in strict accordance with manufacturer's details. The contractor is to submit a detailed method statement outlining how waterproof membranes are protected form damage during construction.
4. Construction joints are to be minimised in the basement slab and retaining walls with the contractor's construction joint layout submitted to the engineer for review. All joints are to have their faces well scabbled and incorporate a continuous proprietary water bar at mid-height.
5. All works shall be carried out in a safe manner and in accordance with the Health and Safety Regulations. Method Statements (where required) shall be submitted to the Engineer or other appointed person(s).
6. The contractor is to exercise care in backfilling behind retaining walls to ensure that loads do not come on the wall which it was not designed or in a manner for which it was not designed. Where retaining walls are propped in the permanent case by the ground floor slab, no backfilling shall take place prior to ground floor slab construction.
7. The Contractor shall comply with all Statutory Authority requirements including Planning Conditions, Fire Safety Certificate Conditions, Local Authority drainage requirements etc.
8. Refer to architect's details for podium slab waterproofing specification with specialist interface detail with retaining wall waterproofing to be submitted by waterproofing specialist to the design team for review to ensure system compatibility.

F. CONCRETE FLOORS AT GRADE AND CONCRETE FOOTPATHS / SPECIFICATION FOR FILLING

1. Ground floor slab construction (including granular hardcore below) is to comply with OCSC ground floor slab specification document.
2. Refer to ground investigation report for details of existing ground conditions and soil make up.
3. Formation level for the ground floor slab must be taken down to competent bearing stratum throughout. Made ground is to be removed under the entire building footprint and replaced with granular hardcore. Allow for local deep pockets of made ground removal and replacement with well compacted granular hardcore. Hardcore is to be laid and compacted in 225mm layers in accordance with OCSC ground floor slab specification. Made ground is to be disposed of at a licensed recycling or landfill facility.
4. All fill materials shall be non-frost susceptible as defined in the Road Research Laboratory Report No. SR829. Granular fill to comply with SR 21:2004+A1:2007 and in particular Section 3.4 and Annex E. hardcore fill shall be free of broken concrete, broken pavement, wood, orgnanic or other deleterious material. Additionally, the following are to be considered in respect of fill material that may be placed close to (ie within 500mm of) unprotected concrete and/or steel elements as the case may be :
   a. Close to concrete but not to steel : the chemical requirements in Clause 801, Paragraph 2 (UK Highways Works Specification, Nov 2009) shall be complied with;
   b. Close to steel but not to concrete : the chemical requirements of Clause 809 (NRA Specification) shall be complied with;
   c. Close to steel and to concrete : the chemical requirements of Clause 809 (NRA Specification) shall be complied with, and, further the 2:1 water soil extract prepared for the determination of water - soluble sulphate content shall have a pH value of not less than 7.2
5. Ensure that no out of balance forces occur on masonry rising walls to cause undue distress in the masonry. A balanced fill approach shall be adopted.
6. In order to assure that the hardcore is adequately compacted the contractor shall engage a specialist geotechnical company to carry out and report on the following plate bearing tests:
   (i) 305mm diameter plate bearing test to sub-floor area (1 per 50 m² of floor area), to be carried out after compacting 2no. layers.
   (ii) 305mm diameter plate bearing test to sub-floor area (1 per 50 m² of floor area), to be carried out after compacting to formation level for the ground floor slab.
   (iii) Tests to be carried out as per (i) and (ii) above at locations to be agreed on site with the Engineer.
   (iv) Each test shall be carried out on an initial & re-load basis. The minimum acceptable modulus of reaction after compaction at each test shall be as follows:
   Initial = 75MN/m/m²
   Re-load = 150MN/m/m.
7. The Engineer shall be verbally informed of the test results on the same day before any further compaction of subsequent layers takes place. The geotechnical specialists shall forward a report to the Engineer for record purposes.
8. If above compaction rates are not achieved the contractor shall propose and agree alternative working practices with the Engineer.
9. Refer to Architect's drawings for all insulation, DPM's, radon barrier & sumps. All penetrations through the ground floor slab are to be sealed using proprietary top hat sections bonded to the radon barrier.
10. Radon/gas protection system to be designed, installed and certified by a specialist sub-contractor. Collateral warranties shall be required upon completion of the installation, testing, commissioning etc. These warranties should relate to each element namely:
    - the radon/gas proof membrane
    - the passive ventilation system
11. Radon/gas proof membrane to be installed in line with current good practice under Construction Quality Assurance with integrity testing and independent validation.

G. TIMBER

1. All timber works to be in accordance with all relevant specifications and all relevant Irish Standards, I.S. EN 14081, I.S. EN 1912, I.S. EN 338 and I.S. EN 1995.
2. All timber work to be in accordance with the Engineers Timber specifications (u.n.o. elsewhere).
3. All timber to be grade C16, in accordance with Table 1 of I.S. EN 338, or better unless noted otherwise (u.n.o) and marked/stamped with the appropriate strength class. All dimensions and roof pitches to be confirmed on site prior to any manufacture.
4. Refer to appropriate G.A. drawings for loadings.
5. Spacing of prefabricated timber trusses shall be at 600 c/c maximum u.n.o. Floor joists shall be spaced at 400 mm c/c maximum (u.n.o.) to prevent excessive floor board deflections.
6. All timber work used on site shall have preservative treatment using the double vacuum treatment process with an organic solvent preservative to comply with I.S. EN 1995. Ends of all timber work, timber work sawn cut, notched, birds mouthed etc. on site shall be liberally coated with 2 No. coats coloured wood preservative 'Protim' or similar compatible with the double vacuum treatment.
7. Truss manufacturer shall allow for design, supply and erection of all roof trusses (complying with I.S. EN 1995), infill timbers etc. together with all necessary fixtures and fittings (Brackets, bolts, truss clips and straps etc.). Timber section size shall be no less than 42mm wide for truss spans in excess of 8m.
8. Timber wall plates to be bolted down to RC perimeter tie beam/U-block band beam using M12 bolts @ 900c/c (max). Proprietary 30 x 5 Galvanised straps to be secured to tie beam/U-block @ 1800c/c (max) and fixed to trusses.
9. Bracing - Bracing members are to be a minimum of 100 x 25 C16 continuous flat members, fixed to top of ceiling members, are for over all building stability. Laps to be spread over 3 No. trusses. All other bracing members to maintain stability of trussed rafters including additional chevron, longitudinal and member stability bracing to be in accordance with I.S. EN 1995. The truss manufacturer shall supply and fix all additional bracing members (over and above that noted above) as may be required from design.
10. All nails to be a minimum of 10g x 75mm long galvanised round wire nails. Where proprietary hangers/truss clips are used each hole available for fixing shall be occupied with a nail.
11. At the heads of all timber stud walls allowance should be made for 20 mm vertical deflection of the floor above through the use of deflection heads to Architects detail.
    Fire stopping of deflection heads is to Architects detail.
12. Bridging noggins are to be provided between all floor joists at 1.35m max. centres where the joist span exceeds 2.7m. Bridging noggins to be at least 0.75 times the joist depth.
13. All floor joists are to be tied to masonry support walls using restraint M305 bat straps at 1200 c/c.
14. Plywood flooring: All flooring must be laid with staggered joints. The edges of all sheets must be supported on a joist and fixed all round by screws at 300 c/c maximum.

H. CONCRETE : GENERAL

1. All concrete works to be in accordance with all relevant specifications and all relevant Standards and Eurocodes.
2. All concrete work to be in accordance with the Engineers concrete specifications (u.n.o. elsewhere).
3. All concrete soffits and sides that are cast against ground are to be protected by 50mm blinding or shuttering while in the wet state. The Contractor shall issue the method statement (including construction joints) to the Engineer for review.
4. All reinforcement bars shall be Ductility Class B in accordance with BS 4449 and I.S. EN 10080 with yield strength of 500 N/mm and shall be denoted H. All wire mesh shall be in accordance with BS4483 with minimum yield strength of 500 N/m m². Unless provided within the Tender package from OCSC the contractor is to allow for the preparation of detailed reinforcement schedules to all reinforced concrete elements in accordance with OCSC notes and exemplar reinforcement details The contractor is to allow in his price for the preparation of all rebar schedules making allowance for laps, bending radius, starter embedment and wastage. The contractors construction programme is to allow for 2 week review period by OCSC of the detailed rebar schedule prepared by their specialist detailer.
5. Details of chairs/stirrups/supports to permanent works reinforcement are excluded from Engineer's schedule and are by others.
6. For all penetrations refer to Architects/Service Engineers/Specialist's drawings. These are to be submitted to Engineer for review prior to issue for construction. Approved drawings are to be used for construction only.
7. For details of all cast in fixings refer to Architects/Service Engineers/Specialist's drawings u.n.o. elsewhere. These are to be issued to Engineer for review prior to issue for construction.
8. For cover to reinforcement refer to Engineers drawings.
9. The Contractor shall submit drawings showing the locations of all sleeves, openings etc. for review by the Engineer.
10. The location of non-structural concrete up-stands will be indicated by the Architect.
11. Reinforcement to metal decks generally to be mesh as indicated on Engineers drawings. The Contractor shall estimate and provide the necessary quantity of reinforcement, including allowance for laps.
12. Aggregates in concrete in foundations or new piles etc. in contact with the ground to be mix reference 'X' as per Cast In-situ Specification.
13. Refer to Engineers Cast In-situ Specification and Project GA drawings for concrete grades/mixes etc.
14. The Contractors shall refer to the Architect's schedule, Engineers Cast In-situ Specification and all other relevant standards for concrete finishes. Samples of exposed concrete finishes shall be made on site using the proposed materials, methods of working and operatives likely to carry out the permanent work and shall be subject to agreement with the Engineer and Architect.
15. All masonry connecting to concrete shall be tied to same using 'Dovetail Inserts' or similar approved at 225 c/c vertically and or 450 c/c horizontally (as appropriate).
16. Unless noted otherwise on the Engineers drawings Ground Bearing floor slabs are to be jointed at 4.5 to 6m centres(Max) in both directions with isolation joints provided adjacent all walls and columns. The contractor is to submit his joint layout for design team review prior to any slab construction commencing on site. Unless noted otherwise and for pricing purposes ground floor slab jointing is to comprise the following:
    (i) Full depth contraction joints in the longitudinal direction with H12 dowel bars complete with de-bonding sleeves at 300mm centres.
    (ii) Induced saw cut joints in the transverse direction with joints formed within 24hours of slab pouring.
    For all other elements of concrete structure the contractor is to submit his proposed construction joint layout for design team review noting that the architect will have particular requirements for locations of joints in exposed concrete walls and slab soffits etc.
17. The Contractor is to ensure all formwork joints are fully sealed and inspect same prior to every pour to minimise grout loss particularly at kicker level.
18. For concrete in contact with the ground the Contractor is to forward a mix design for agreement which takes into account any sulphates, chlorides or other contaminants which may be present in the ground. Mix design to be in compliance with BRE Special Digest 1: Concrete in Aggressive Ground and BS 8500 and EN206. Refer to SI Report for contaminants present.
19. Where suspended ground floors are proposed the Contractor is to provide a 150mm (min.) vented void below the slab level with venting to Architect's detail. The base level of the vented void is to be at or above external ground level.

SPECIFIC NOTES FOR CASTING OF RC EDGE BEAMS

20. Contractor to note maximum permissible deviation of RC in-situ edge beams is limited to 10mm on plan. Notwithstanding this, it is the contractors responsibility to check that the above tolerances are sufficient to accommodate fittings, prefabricated items, pre-cast cladding panels, window frames etc. and the contractor shall work to reduce tolerances when required for these items.
21. The Contractor to record workability of concrete (via slump test) prior to every pour.
22. Concrete cubes to be tested by an independent third party company in accordance with OCSC cast in-situ concrete technical specification. Cubes shall be properly cured in a bath on site with cube test results to be clearly cross referenced to the individual concrete element by way of gridline reference or other suitable method etc. Unreferenced cube test results will not be accepted by the Engineer and returned for cross referencing.
23. Total deflection of beam and slab structure is limited to span/250 with live load deflection (after partition and finishes installation) limited to span/500 for spans up to 10m. Note for slabs supported on beams the beam and slab deflections are additive.

H1. PRECAST CONCRETE

1. All precast concrete works to be in accordance with all relevant specifications and all relevant Eurocodes, Irish or British Standards.
2. All precast concrete work to be in accordance with the Engineers Precast Concrete Specification.
3. Size of members/thicknesses of floors etc. as indicated on Engineers drawings are all subject to detailed design by the precast supplier in accordance with loads indicated on Engineers Project GA's drawings or specified elsewhere. Loads indicated exclude self-weight of precast slabs.
4. 2 copies of design calculations and drawings shall be submitted to the Engineer for agreement prior to any fabrication allowing reasonable time for return of comments.
5. All core cut-out, solid ends and cast-in reinforcement for tie connectors/peripheral ties shall be as indicated on the drawings and carried out at the works.
6. Unless noted otherwise on the Engineers drawings, the Contractor shall allow for the following reinforcement ties;
   - A142 mesh fabric in structural screeds (centrally located) and lapped min. 300mm on all sides.
   - H12 @ 600 c/c x 1200 long internal continuity ties located in cores or to lap in with mesh reinforcement.
   - H12 @ 600 c/c x 900 long 'L bar' or 'hooked bars' edge continuity ties located in cores or to lap-in with mesh reinforcement.
   - 1 No. H12 peripheral tie fully anchored at discontinuity/corners/laps etc.

   NOTE. All cores where reinforcement is to be placed shall be cleaned out, grouted and compacted. All reinforcement to be supported on chairs or other approved.
7. Holes or openings greater than 150mm sq. through any floor units not indicated in the Engineers drawings shall not be made without the permission of the Engineer.
8. Any holes or openings through any other members not indicated on the Engineers drawings shall not be made without the permission of the Engineer.
9. No on-site coring or forming opes are permitted without the Engineer's approval.
10. All fixings to underside of slabs (or tops where top pre-stressing is provided) shall be to the manufacturers approval.
11. All finishes to be agreed with Client/Architect.
12. Where structural screeds are required the top surface of the precast units is to be roughened to ensure bonding and composite action.
13. Precast stairs in RC cores: the design intent is that precast stair flights are used in conjunction with cast in-situ landings. If the Contractor proposes to adapt precast landing slabs no chemical or expansion bolt fixings are permitted to support same. Through bolt only connections are the only detail permitted. The Contractor to note it is not permitted to support any precast elements using any type of chemical or expansion anchor bolt system (through bolt only). See also Anchor fixings
14. Precast hollow-core units in basement or multi-storey car parks and roofs shall have all cores at bearings in-filled with C30/37 concrete to I.S. EN 206-1 table 7, and max aggregate size of 10mm to prevent any future water ingress and freeze thaw action.
15. Grout tubes in precast construction: if grout tubes are adopted at precast connections (e.g. PC columns) the Contractor shall ensure no voids remain after grouting. Volume of grout used is to be checked against grout tube volume.
16. 16. Prior to the manufacturer of any PC units the as-built dimensions of supporting structure shall be measured by the Contractor (including rising walls, corbels, nibs, shelf angles etc.) to confirm minimum bearing lengths can be achieved on site.
17. PC units:
    Installation of PC Units:
    All steel beams supporting precast units are to be fully propped during construction.
    - The Contractor shall provide a detailed method statement for installation of PC units.
    - Under no circumstances shall the installation of PC units cause an out of balance loading on the supporting elements.
    - Where propping of PC units is carried out (for whatever reason) the Contractor shall ensure that the floor(s) supporting the props have sufficient capacity and that their ability to support the permanent loads will not be affected.
18. The PC Specialist is responsible for the design of all fixings such as hangers around opes, stair slab connection to landings etc., with calculations submitted for review.

H2. INSTALLATION OF ANCHORS IN CONCRETE

1. All anchors shall be specified and designed in accordance with the Health and Safety Authority (HSA) Code of Practice for the Design and Installation of Anchors. Similarly anchors are to be installed in accordance with the above mentions code of practice. The anchor specifier shall complete the specialist designer forms at commencement and completion stage as required by the Assigned Certifier under the BCAR.
2. The main contractor should ensure that the person(s) installing the anchors is competent and has sufficient training, knowledge and experience as per section 10 of the HSA Code of Practice for the Design and Installation of Anchors. Site installation operatives shall receive training from the anchor supplier with regard to the correct procedures to be followed for the installation of each type of anchor. Records of training shall be kept by the site supervisor and made available to the anchor specifier and engineer on request. Prior to commencement, operators are to undergo an induction course by a representative of the anchor manufacturer.
3. The main contractor shall appoint and name the person(s) who will supervise the installation of anchors on site. The anchor installation site supervisor shall ensure that the anchors are installed as per section 11 of the HSA Code of Practice for the Design and Installation of Anchors.
4. The site supervisor shall ensure the concrete base material has reached the compressive strength as stated by the specifier (and /or engineer) in their design of the anchors.
5. In the event that the anchor hole(s) clashes with reinforcement or other changes arise, the supervisor shall give clear instructions to the anchor installer for the correct installation of the anchor. In general pilot holes are to be drilled to ensure no cutting of concrete reinforcement takes place. Hole positions to be established prior to any fabrication.
6. The anchor specifier (and /or engineer) shall be made aware of and approve the changes prior to the anchor(s) being installed on site. Anchors are to be installed prior to manufacture of steelwork. Steelwork is then to be made to match anchor locations where anchors are installed.
7. The anchor hole(s) shall be drilled in accordance with the anchor suppliers guidelines, taking particular care to ensure holes are drilled to the correct diameter and depth and drilling method is appropriate for the anchor specified.
8. Anchor hole(s) shall be cleaned using the correct tools and all dust and fragments removed via air pressure or vacuum in accordance with the suppliers guidelines prior to anchor installation.
9. No grout or shims shall be placed between the fixture and the base material without prior written approval from the anchor specifier and engineer. Any deviation from the stand-off details must be reported to the anchor specifier and engineer prior to any load being applied to the anchors.
10. Shims shall be full size steel shims to match the fixture size. Local packers or finger shims shall only be used where the stand-off detail is to be grouted permanently.
11. 1Grout to be used for stand-off details shall be non-shrink grout with a compressive strength not less than the base concrete compression strength.
12. Torque Controlled Expansion Anchors
    a) During installation of the fixture the anchor bolt(s) shall be tightened to the torque as specified by the specifier.
    b) Nuts shall be fully threaded onto anchor bolts.
    c) Anchor bolts shall be checked after full dead and super-imposed loads have been applied to the fixture and re-torqued if necessary.
    d) A calibrated torque wrench shall be made available to the anchor specifier and/or engineer to test anchors bolts at their discretion.
    e) A certificate of calibration shall accompany each torque spanner on site.
    f) Record of torque settings : each anchor shall be given a designated number. The number can be marked on the concrete wall next to the anchor. The torque set must also be written on the wall. A record of the torque versus designation number of the fixing, to be recorded and kept in the safety file.
13. Bonded Anchors
    a) The site supervisor should take note of the ambient temperature and ensure that resins are stored, mixed and applied strictly in accordance with the manufacturer's instructions.
    b) The gel time, curing time and setting time shall be adjusted by the site supervisor to take account of the ambient temperature when resins are mixed and applied.
    c) Cartridge based resin systems shall only use the manufacturers supplied mixing nozzle and shall ensure that fully mixed and consistent resin is used. The manufacturers guidelines should be followed with regard to mixing resins and volume of initial partially mixed resin to be discarded.
    d) The use of free/bulk mixing of resin should be agreed in writing with the specifier (and/or engineer) prior to use on site.
14. Site supervisor shall ensure that anchors are not exposed to corrosive environment which may damage or reduce the capacity of the anchor during construction. The anchor specifier (and/or engineer) shall be notified in writing whilst anchors are still accessible of any such occurrence.
15. Anchor Testing where required by the anchor specifier (and /or engineer) shall be carried out to BS 8539. The sample rate shall be either 1 in 40 (in which case the proof test load is 1.5 x the characteristic action), or 1 in 20 (in which case the proof test load may be 1.25 x the characteristic action) and at least three anchors should be tested. The details of all load testing shall be agreed with the anchor specifier and the engineer.
16. The site supervisor shall complete and sign FM-03. A register of completed FM-03 forms is to be kept by the main contractor on site for inclusion in the safety file.

I. STEELWORK

1. The Contractor is to carry out a detailed survey of the existing steelwork or other elements to which the new works attach prior to the design of connections and drawing of fabrication drawings. Dimensions are given for guidance only at Tender. These surveys are to be issued to the Architect and Structural Engineer, no delays or costs associated with alterations being required where these surveys have not been carried out will be accepted.
2. All steelwork detailing, fabrication and erection to be in accordance with the latest issue of EN 1993 including all latest amendments unless modified by Engineers Specification.
3. All steelwork to be grade S355 to I.S. EN 10025 unless noted otherwise on the OCSC Project drawings. Steel subgrades shall be in accordance with Table 2.1 of I.S. EN 1993-1-10, based on their location (i.e. internal or external space etc.). Fabricator is to note all subgrades used on the fabrication drawings for approval.
4. All connections are to be designed and detailed by a suitably qualified and experienced engineer for the steelwork fabricator, in accordance with loadings advised by OCSC. Calculations and details shall be submitted to the Engineer and Design Team for review. For QS preliminary measurement purposes allow 10% of steel tonnage for connections.
   All visible steel connections are to be submitted to the Architect for review with welds ground down if required by the Architect.
   All non-moment connections shall be in accordance with BSCA/SCI publication "Joints in simple construction".
   All moment connections shall be in accordance with the BSCA/SCI publication "Moment connections".
5. The steel fabricator shall prepare shop drawings for all steel members, including details of any assemblies, bracketry, stiffeners and connections to be fitted in the workshop or on site. The shop drawings shall clearly indicate the steel section size, dimensions, steel grade, bolt holes, bolt size, bolt grade and details of all welds.
   The corrosion protection system shall be clearly detailed on the shop drawings. The shop drawings shall be submitted in hardcopy to the Engineer, and where required to the Architect and Service Engineer, for review prior to fabrication of steelwork. An electronic 'soft' copy of the shop drawings issued for fabrication/construction shall be submitted to the Engineer in DWG and PDF format. The fabricator shall update the as built steel details at the end of construction on site and issue them to the Engineer in DWG and PDF format.
6. All temporary bracing is to be set out on the centroids of bracing members and on the centre line of the beams except temporary shear wall bracing which is placed centrally about the R.C. dimensions. Temporary vertically braced shear wall panels where relevant to be cast in to RC wall.
7. Column splices, column shafts to baseplates and top surfaces of baseplates shall be machined for bearing. Length and thickness shown are after machining. All tolerance for machining shall be allowed for by the steelwork Contractor. The air gap between bearing surfaces measured in any direction shall not exceed;
   (a) over 50% of the length measured; 0.5mm.
   (b) over 90% of the length measured; 1.0mm.
8. For types of fire protection and fire ratings see Architects drawings.
9. All permanently exposed steel shall be fire protected to the Architects specification to be applied in conjunction with the OCSC paint specification for corrosion protection. All concrete encased steelwork to be cleaned by wire brushing to remove all loose mill scale and grease.
10. The steelwork fabricator is responsible for the stability of the structure during all stages of erection i.e. its temporary condition including the effects from wind, tower cranes and hoists where these are supported and/or restrained by the structure. The steelwork fabricator must take into account the erection programme of the Contractor and be responsible for the design, detailing and supply of all necessary temporary bracing etc. that may be required to ensure the stability of the structure during erection and until the concrete slabs have matured. These details to be supplied to the Structural Engineer for review before fabrication commences. All temporary bracing etc. to remain in place until the concrete slabs have matured sufficiently to form a horizontal diaphragm carrying all temporary loads back to the wind frames or concrete shear walls.
11. No site welding or site cutting of steelwork shall be allowed without the express approval of the Structural Engineers. Areas where site welding is to be carried out are to be thoroughly cleaned by wire brushing to remove the existing paint and other contaminants prior to commencement of any welding. This work shall be carried out in accordance with Health and Safety Regulations. All corrosion and fire protection paint to be reapplied to match the appearance and comply with the rating of surrounding areas.
12. For details of size and position of all penetrations through solid web beams see relevant Engineers drawings. Any alterations are to be issued to Engineers for review prior to issuing for construction.
13. For details of sizes and positions of all bracketry required by other trades e.g. lifts, cladding, stairs, lightning protection etc. see relevant Specialists drawing. These drawings are to be issued for review to Engineer prior to issuing for construction.
14. Deflection (under live load) limitations are as below (unless noted otherwise); Specialist sub- contractors to allow for same in design of services, cladding and all other finishes:
    Perimeter facade beams: (L) span/360 - Glazing /Cladding
    Beams supporting brittle finishes: span/360
    All other beams: span/200
    Cantilever beams: span/180
    Horizontal wind deflection of the frame in any storey = storey height/300 (cumulative over the height of the building)
    *Deflection of beams supported on beams is cumulative and must allow for deflection of their supporting beam.
15. Steelwork with an internal level of corrosion protection which is left exposed to the elements due to erection programme etc. is to be protected by an approved method to be agreed prior to the arrival of steel to site.
16. Paint Protection System (unless noted on Engineer's Project GA's)
    (a) All paintwork should be carried out in accordance with EN ISO 2808, I.S. EN ISO 8501, I.S. EN ISO 8503, I.S. EN ISO 12944, and ISO 19840 unless otherwise specified.Finish Painting shall be in compliance with the architects details and otherwise to the requirements of I.S. EN ISO 12944.
    The minimum coatings to satisfy durability requirements shall be applied in accordance with CIRIA document 174 "New paint systems for the protection of construction steelwork"
    (b) Bolts which have been coated shall be manufactured with sufficient thread clearance to give a satisfactory fit in the finished bolt or nut.Selection of shop primers with topcoats to be applied over them shall be coordinated. Paint and coating manufacturers' recommendations shall be complied with to ensure that shop primers and topcoats are compatible with one another.
    The guidance provided in I.S. EN ISO 12944 shall be complied with.
    (c) The method and procedure for checking the thicknesses of dry films on rough surfaces shall be in accordance with ISO 19840, and for smooth and galvanized surfaces in accordance with EN ISO 2808, unless otherwise agreed. "DFT" means dry film thickness. "WFT" means wet film thickness.
    (d) Surface preparation standards shall be in accordance with I.S. EN ISO 8501-1. Oil, grease, dirt, rust and mill scale shall be removed by an approved chemical process. Cleaning chemicals shall be completely rinsed off.Cleanliness of surfaces shall be in accordance with I.S. EN ISO 8501-1. The surface profile shall be compatible with the coating to be applied in accordance with I.S. EN ISO 8503-2.
    (e) Unless otherwise agreed or specified, all steel other than cold formed sections and pre-primed hollow sections shall be blast cleaned and protected with blast primer, in compliance with I.S. EN ISO 12944-5. All paints are to come from the one approved manufacturer. Paint is to be applied strictly in accordance with the recommendations of the manufacturer. Alternative protective systems may be proposed and used if approved by the engineer.
    (f) The mating surfaces of HSFG bolted joints shall not have paint applied to them. Surfaces to be encased in concrete shall not have paint applied to them. For top flanges of beams which are in contact with a metal deck to form a composite section the entire top surface will be left unpainted except for a strip of maximum dimension 25 mm width on the outside edges of the flange running along the length of the member. Coatings shall not be applied:
    1. To surfaces affected by condensation, damp or frost.
    2. When heat is likely to cause blistering or wrinkling.
    3. When ambient temperatures are below 4 degrees centigrade.
    4. Before previous coats have hardened sufficiently.

    (g) Adequate precautions shall be taken to minimise damage to coatings, both at works and on site. Any paint coating or galvanising which gets damaged or does not meet the specification shall be suitably prepared and spot-patched or otherwise treated as instructed, before the next coat is applied. The main contractor shall ensure that the steel fabricator has applied the primer as specified before continuing with the protective system. The Engineer and inspecting authority shall be notified of projected date(s) for start of surface preparation and coating.
    (h) Cold form steel sections (e.g. purlins, sheeting rails etc.) and their cleats, sleeves, sag bars and all other ancillary items including fixing nuts and bolts shall be galvanized.
    (i) Where the fabricator can show that Hollow sections which come adequately primed from the manufacturer they need not be blast-cleaned. Where a single pack primer has been applied it will not be considered suitable for over coating with a two pack system. Following fabrication of the steelwork all weld and spatter, rough edges, etc. shall be removed by careful scraping, chipping and grinding to a smooth surface. Any unsound or scorched primer around welded areas is to be removed along with dust, dirt, grease, etc. Blast cleaning shall be to preparation grade Sa 2 ½ or in accordance with I.S. EN ISO 8501. All traces of loose rust, grit and other debris shall be removed by compressed air hose or by careful clean dry brushing. Laminations shall be removed by careful grinding, to produce a smooth surface. Unless otherwise agreed, within two hours of shot blasting the surface shall be dusted off and the specified blast primer shall be applied. The time between completion of blasting and placement of primer shall never be allowed to be greater than 24 hours.
    One coat of primer in compliance with BS 5493 shall be applied to all steelwork except for encased or galvanised sections. Areas to be site welded shall be masked. Loose scale, loose rust and grease shall be removed from contact surfaces and surfaces inaccessible after assembly prior to applying primer which shall be as specified for adjacent surfaces. Two coats of primer shall be applied to surfaces inaccessible after shop assembly. The surfaces shall be brought together while the paint is still wet. Paint shall be allowed to dry hard before dispatch to site (5 days minimum).
    Unless otherwise specified, following erection the main contractor shall clean off all dust, dirt, grease, and other debris.
    (j) DFT specified is the nominal DFT and shall comply with the relevant British Standards or other relevant standards. The average of DFT readings shall equal or exceed the nominal DFT and no reading shall be less than 80% of nominal DFT.
    (k) To each item to be painted the following should be applied:
    1) Undercoat FUIB (DFT 40um) (MIO/modified phenolic);
    2) Finish FFIB (DFT 40um) (MIO/modified phenolic).

    (l) Preparation by wire brushing etc. shall not be employed unless specifically approved by the Engineer. Where wire brushing is approved the protective system must also be approved by the Engineer and/or Architect prior to c commencement of application.
    (m) Each coat shall be stepped back 30mm from the previous coat adjacent to joints which are to be welded after completion of painting.
    (n) For steelwork to be placed within the cavity of external façade masonry walls steelwork should be galvanised and painted with 2 coats of heavy duty bitumen. For façade wall cavities in which steel will remain dry by use of an impermeable outer cladding, a paint protection system appropriate to the internal building environment category shall be used (C2 environment category minimum u.o.n). Alternative forms of protection shall not be applied without specific approval from the Engineer.
    (o) For steelwork located below ground provide minimum 100 mm concrete surround with a minimum of D98 mesh reinforcement.
17. The materials used for the various coats shall be manufactures by the same supplier unless agreed in writing with the Engineer. The colour of each coat shall be different and materials compatible. Particular care must be taken in selecting the correct prefabrication primer (if used) and its suitability of any subsequent welding operations. All blasting and painting operations shall be carried out under fully weather proofed enclosures with good lighting, ventilation and heating conditions. The Contractor is to take appropriate measures to protect shop applied paint during steelwork installation and allow for "touch up" coats as required.
18. The Contractor is to allow for probing and use of cover meters when forming connections for the new steelwork in existing concrete. Note no reinforcement is to be cut without the express permission of the Engineer. The Contractor is to carry out such investigation as may be necessary in advance of fabrication and allow time for these works in his programme.
19. The steelwork fabricator is to bear in mind that dimensions between existing faces/supports could vary and is to refer to dimensions taken by the Contractor when the setting out of the building is confirmed and carry out his own check survey prior to fabrication.
20. Bolts of the same diameter, but different in grade (i.e. 8.8 or 4.6) are not to be used on this project.
21. Top flange of all beams to be left unpainted where metal decking is laid over. Top face to be free of rust, mill, scale, dirt etc.
22. All holes to be formed horizontally into existing concrete to receive anchor bolts of the Steel to Concrete. Endplate connections are to be drilled inclined slightly downwards to facilitate the retention of the anchor grout.
23. All steel materials shall be compatible with each other and their intended use (i.e. isolation membrane between stainless steel and mild steel to prevent bi-metallic corrosion in particular environments).
24. Only Stainless Steel Proprietary Products shall be incorporated into cavity construction.
25. Any buried steelwork below ground level is to be surrounded with 100mm (min.) C30/37 concrete to I.S. EN 206-1 table 7, and max aggregate size of 10mm, with D49 wrapping mesh.
26. Steel beams supporting precast floor units are to be propped during construction to prevent beam rotation during PC unit installation or due to asymmetric loading arrangements. Design of temporary propping of steelwork is the responsibility of the Contractor.
27. Plate girders shall be fabricated using butt welds unless otherwise noted.

BOLTS/NUTS/RODS ETC.

a. All connecters to be grade 8.8 sherardized bolts, nuts and washers unless noted otherwise on the Project GA drawings.
b. Locations of splices are indicative only and are dependent upon steelwork Contractor's method of erection and transportation subject to approval by the Engineer.
c. Minimum 2 No. bolts to be provided at each connection unless noted otherwise or as specifically indicated at exposed/expressed stainless steel pin connections.
d. All exposed/expressed feature stainless steel pin joint connections shall be formed using (refer to details for size) stainless steel pin + stainless steel locking ring (with chamfered edge) and Allen key + locking nut.
e. Taper washers to be provided where connecting to member with sloping faces.
f. Provide nuts and 'lock-nuts' to ends of all bolts/tie rods etc. in tension.
g. Proprietary forked-ends, eye rods, swaged connectors, bolts and couplers to suit size of tie rods/wires as indicated on details.
h. Connector capacity shall be based on the maximum safe working load in the rods/wires.
i. Turnbuckle couplers to be provided as indicated or as required to suit where the maximum available length of tie rod/wire system is exceeded.
j. All connections shall be designed to support a minimum shear or tension load of 100Kn (u.n.o)

WELDS

a. No on-site welding is permitted without prior approval from the Engineer. If site welding is required, the Contractor is to submit the following information to the Engineer :
   (i) Method statement for the site welding including locations of all welds
   (ii) Details of sub-contractor and qualifications of personnel carrying out the welding
   (iii) Details of independent testing company (see notes below for testing of site welds)
b. For long span elements of structure the Contractor should review proposed erection and transportation sequence with sub-contractor and to make adequate allowance for on-site butt and fillet welds if required. Independent testing in accordance with notes (c) and (d) should also be allowed for. Site welding locations will have to be agreed with and approved by O'CSC. All site welding is to be in accordance with I.S. EN 1993-1-18, I.S. EN 1011-1, BS EN ISO 15609 and the SCI Publication P161 "Guide to site welding"
c. All welds to be minimum 6mm full profile fillet welds (FPFW) unless noted otherwise. For exposed feature members or as directed by the Engineer, welds shall be 'ground down' where appropriate.
d. Butt welds shall be ultrasonically tested by an independent testing authority. Fillet welds shall be examined by magnetic particle testing. Ultrasonic or X-Ray (or other approved) testing of welds to be in accordance with BS EN ISO 17640. Magnetic particle testing of welds to be in accordance with BS EN ISO 17638. Visual inspection of welds to be in accordance with BS EN ISO 17637.
e. In addition to the visual inspection of 100% of all welds to the steelwork the following non-destructive testing shall be performed;
   i) 100% of all site welds. Quality category 'B' of table 1 of BS EN ISO 5817 for acceptance levels of butt and fillet welds respectively shall apply.
   ii) 20% of all other welds to be randomly selected by the independent testing authority. Quality category 'B' of table 1 of BS EN ISO 5817 for the acceptance levels of butt and fillet welds respectively shall apply. However, in the event of any welds failing the 100% inspection of welds to quality category 'B' of table 1 of BS EN ISO 5817 shall be adopted.
f. Costs for all tests shall be deemed to be included within the Contractors tender price.
g. All test certificates/reports shall be forwarded direct to the Engineer.
h. All connections to be designed to support a minimum shear or tension load of 100kN (u.o.n.)
i. Where required all connections between the structural frames, lift guide rails and counter weight guide rails, shall be made such as to avoid any torsion applied to the structural steel eg. vertically slotted holes with shoulder bolts. For cases where torsion is unavoidable then the Engineer must be informed of it's magnitude for approval. Lift guide rails shall be designed to span vertically between floors without any additional support (where applicable)

SITE DIMENSIONS ETC.

a. Prior to fabrication, the steelwork contractor is responsible for carrying out a detailed survey of all dimensions (existing and new), levels, holding down bolt positions, existing member sizes, profiles etc.
b. The contractor is to carry out a detailed survey of the existing steelwork or other elements to which the new works attach prior to the design of connections and drawing of fabrication drawings. Dimensions are given for guidance only at Tender. These surveys are to be issued to the Architect and Structural Engineer, no delays or costs associated with alterations being required where these surveys have not been carried out will be accepted.

MATERIALS

a. The steelwork contractor shall provide to the Engineer all necessary samples, material test certificates, mill certs, specification/data sheets for proprietary products.
b. All steelwork materials shall be compatible with each other and their intended usage (ie. isolation membrane between stainless steel and mild steel to prevent bi-metallic corrosion in particular environments etc).
c. Samples of all materials used including structural steel, bolts, nuts, stainless steel, proprietary products etc. shall be submitted to the design team for approval.

SHEAR STUDS

a. Shear studs and their layout shall be as indicated on the Engineers drawings and welded to structural steel members in the shop. Where continuous double span composite metal decks have been specified through deck welding of shear studs on-site will be required and is to be in accordance with I.S. EN 1993-1-8, I.S. EN 1011-1, BS EN ISO 15609, category 'B' of table 1 of BS EN ISO 5817 and BSCA Code of Practice for Metal Decking and Stud Welding.
b. Testing of shear studs shall be carried out in accordance with BS EN ISO 14555 and BCSA Code of Practice for Metal Decking and Stud Welding. All shear studs shall be subjected to a 'ring test' during the visual inspection.
   After the visual inspection bend test shall be carried out to a minimum of 5% of welded studs with no less than 2 studs per beam.
c. No shot fired shear studs are acceptable.

PRE-CAMBER

The magnitude of pre-camber indicated shall be to the profile as indicated after all fabrication is completed (i.e. after welding shear studs, slim floor flange plate and remaining truss members). Pre-camber to be measured after erection of frame and any trusses or beams with unsatisfactory pre-camber to be removed and replaced with new.

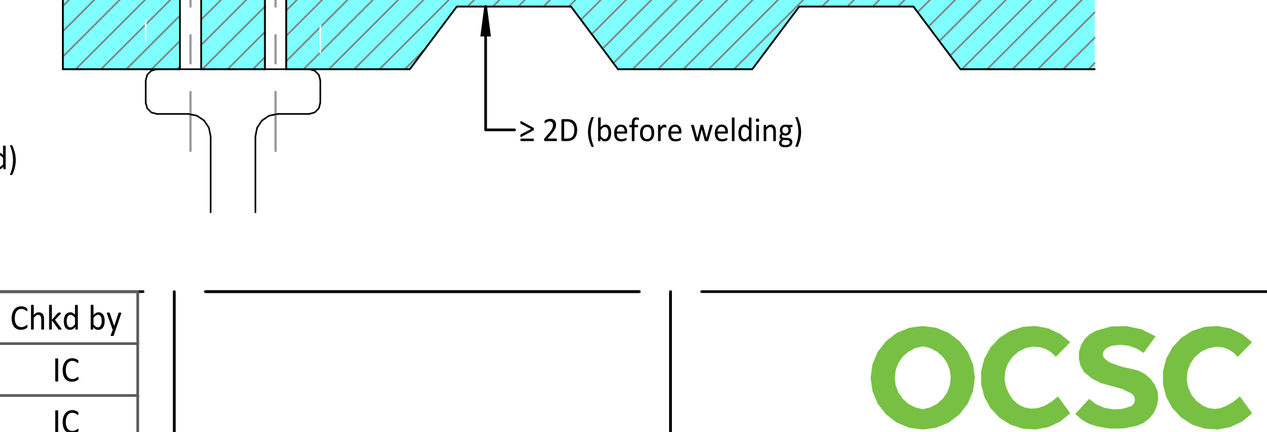
ERECTION

a. Temporary stability during steel frame erection is the responsibility of the Contractor. All temporary bracing as required during erection or until frame stability provided by other means shall be provided by steel fabricators. The Contractor should note that permanent case stability is achieved via floor plate diaphragm action which transfers lateral loads to braced bays/ core walls and shall take account of this in his installation sequencing.
b. All temporary/erection bracing as required by the steelwork contractor shall be removed with approval of the Engineer. All temporary bracing brackets/lugs etc. shall be removed from the permanent steel in accordance with methods approved by the Engineer and making good to the satisfaction of the Engineer.

I1. COMPOSITE METAL DECKING

1. All decking to be in accordance with Engineers specification and manufacturers literature.
2. Decking to be secured to steelwork prior to studding by means of shot fired pins at 300mm min. centres or equivalent approved by the Manufacturer.
3. All decking is designed to act compositely with the concrete slab unless noted otherwise. The size of all mesh reinforcing required including any for fire resistance shall be clearly notified. Proprietary reinforcement spacers are to be used throughout to ensure mesh does not sit directly on metal decking and is located in the top of the slab to control shrinkage cracking.
4. The steelwork Contractor shall supply all necessary edge trims to the slabs including all trimming to holes except where holes are cut after concreting or blocked out. Refer to Architects drawings for the edge of slab line set out. Maximum allowable cantilever of metal decking /edge trims at building perimeter is to be confirmed by the steelwork Contractor with temporary propping to edge trims and additional top reinforcement provided as required.
5. The steelwork Contractor is to ensure that the decking is adequately supported and sealed at all obstructions through the slab e.g. around perimeter of columns at bracing connections etc.
6. The steelwork Contractor is to supply metal trays or double edge trim at all beams between slab penetrations unless noted on the drawings.
7. Composite metal decking is as specified on OCSC GA drawings and is to be minimum 1.2mm gauge (u.n.o.) and laid in double spans for continuity over supporting beams.
8. For pricing purposes allow for 2No. 19mm ∅ shear studs at 100mm c/c on primary beams and 2No. 19mm ∅ studs at 300mm c/c on secondary beams.
9. All beams supporting metal deck laid in double spans (for continuity) to have through deck shear studs welded to the top flanges of beams in shop using the 'through deck welding process' in accordance with Messrs Nelson's stud welding specifications. Where there is no decking (or where deck is not continuous) the studs may be welded in the fabrication shop.
10. All beams to be shear studded shall have their top flanges unpainted (except 25mm edge strips of top flange).
11. Where a joint occurs in the decking the studs are to be staggered either side of the joint to ensure fixity to each panel of decking to the steel beam.
12. Studs shall comply with EN ISO 13918. Shear studs shall be 19mm ∅ x 95mm high minimum (u.n.o) after welding. Studs shall have minimum yield strength of 350 N/mm2 and an ultimate tensile strength of 450 N/m m². Where the overall slab thickness is 135mm or greater then 19mm ∅ x 120mm high studs are to be adapted. All studding to be in accordance with Engineers specification and placed in accordance with the following legend.
13. The Contractor shall design, detail, supply and erect the metal deck flooring with a min. Re. of 350 N/m m² including all edge trim to the perimeter, internal service holes and step lines. Submit detail drawings for approval.
14. All metal deck composite slabs to be designed for spans un-propped at the wet concrete stage unless otherwise noted on GA drawings.
15. The profile on sections of metal deck of composite slabs is indicative only. See Engineers specification for metal decking for alternative types permitted.
16. All metal deck at roof level where a waterproofing membrane is laid on top to be perforated with pin holes at 500 centres in each direction to allow moisture escape.
17. For testing of studs on-site please refer to the Shear Studs section under the Steelwork heading of this document.
18. All perimeter beams (and beams adjacent to openings) are to have H12 U-bars placed around all shear studs in accordance with SCI Publication P300 to prevent longitudinal splitting, the Contractor is to allow for scheduling, supply and installation of all H12 U-bars in his price.
19. 19. For trapezoidal decks the Contractor is to allow in his price for fire stopping the voids over fire compartment secondary beams to Architects detail. Alternatively closed ends are to be provided on the decking where required by the Architect.

Minimum transverse spacing shown opposite:



(D = diameter of stud)

I2. STEEL STAIRCASE

1. All steel stairs are to be designed, detailed, fabricated and erected by the Contractor in accordance with the latest issue of IS. EN 1993 and Engineers specification.
2. Design loads for staircases to be in accordance with I.S. EN 1991 and submitted for approval to the Engineer.
3. Refer to Architects drawings for all layouts dimensions, details and finishes etc. All drawings, calculations and details are to be submitted to the Architect and the Structural Engineer for review prior to fabrication.
4. Staircases to be made up in complete flights prior to erection and delivery.
5. All external staircases to be galvanised. Allow for etch primer and finish paint coat to Architects detail

J. MASONRY

1. All masonry works to be in accordance with all relevant specifications and all relevant Eurocodes, Irish and British Standards.
2. All masonry work to be in accordance with the Engineers Masonry specifications (u.n.o. elsewhere).
3. The compressive strength of all load bearing masonry shall be as indicated on the appropriate G.A. drawings.
4. The compressive strength of all infill (non-load bearing) masonry shall be 5N/mm² U.N.O.
5. All masonry above DPC level unless noted otherwise shall be laid in category (iii) mortar designation in accordance with I.S. EN 1996.
6. All masonry below DPC level unless noted otherwise shall be laid in category (i) mortar designation in accordance with I.S. EN 1996. All masonry retaining walls shall be laid in category (ii) mortar designation. All masonry below DPC level is to be solid i.e. no hollow blockwork is permitted with cavities to be filled with mortar as coursing progresses.
7. All masonry supplied to site shall be colour coded in accordance with I.S. EN 771. Agreement or similar certification shall be obtained from the blockwork supplier for each different type of masonry used giving details specified in I.S. EN 771. These shall be submitted to the Engineer.
8. Stainless steel vertical twist type wall ties complying with I.S. EN 1996 shall be provided in accordance with the Engineers specification BS EN 485 or as otherwise specifically stated on the drawings. Wall ties shall in addition be provided at 225 vertical centres and within 150mm from the edges of opes, window and door reveals and joints in masonry. Agreement or similar certification shall be obtained from the supplier giving details supplied in I.S. EN 1996 and submitted to the Engineer.
9. All wall ties/anchors/dowels etc. shall have a minimum of 50mm embedment into each mortar bed joint or masonry leaf.
10. Location and details of control joints in all masonry shall be agreed with the Engineer, Architect and Contractor. For measurement purposes, provide joints at 12m centres generally in brickwork external leaves and 6m centres generally in blockwork external leaves. The spacing reduces to 6m and 3m respectively adjacent to fully bonded return corners. Outer leaf returns less than 675mm are to be jointed. Plaster, stop beads abd accessories at control joints to Architect's details.
11. Expansion joints in masonry shall be formed using 12mm thick 'Hydrocell' or similar compressible filler board and high grade proprietary mastic sealant (to Architects specification) and tape bond breaker.
12. All masonry connecting to reinforced concrete elements, concrete encased steel columns etc. shall be tied to same using 'Dovetail Slots' or similar at 225 vertical c/c and 450 horizontal (where appropriate).
13. All proprietary lintels shall be used strictly in accordance with the manufacturers instructions. (Minimum coating to be galvanised with Bitumen coating for any mild steel lintels in cavities). Agreement or similar certification shall be obtained from the supplier and forwarded to the Engineer. All manufacturers recommendations with respect to bearings lengths/heights of blockwork etc. shall be strictly adhered to. All lintel schedules and design loadings shall be supplied to the Engineer for approval. Where these have not been provided then O'Connor Sutton Cronin cannot be responsible for these elements. If thin walled box section lintels are used anywhere their ends are to be filled with masonry (solidly dry-packed in) to ensure integrity at bearings. All lintels which act compositely with blockwork over shall be propped during construction. No builders work opes are permitted in the 5 courses of composite blockwork immediately above the lintel.
14. U-Block Lintels (where appropriate)
    Unless otherwise stated provide 215 U-block band beam reinforced with 4 H12 (600mm min. laps at all locations including corners) 2 No. top and 2 No. bottom H8 links at 150 c/c over all door and window opes in all internal and external walls. Where opes exceed 2.4m wide, provide hollow block over U-block noted above and fill with concrete at the same time as U-block (i.e. 450 deep reinforced masonry beam). Where opes exceed 3m, provide reinforced concrete lintel to Engineers design. Minimum u-beam lintel bearing to be 200mm.
15. Where U-block lintels intersect with RC columns provide 2 H12 reinforcement bars top and bottom x 600 long dowel bars from column into U-block. Provide 100 deep x 100 x 150 key for support. H12 reinforcement U-Blocks shall be continuous and adequately lapped. (600mm min.)
16. For opes in solid block walls provide 3 courses of GBF 35 W60 SC brickforce (or similar approved) reinforcing to horizontal bed joints directly above ope. Extend minimum 750 beyond ope size.
17. For ready to use mortars, a suppliers agreement or similar certificate of compliance with I.S. EN 998 shall be submitted to the Engineer for each category or mortar designation.
18. 215sq. RC vertical ties shall generally be provided at a maximum of 5m c/c in accordance with I.S. EN 1996 and at locations as indicated on Engineers drawings. Unless noted otherwise reinforcement shall comprise of 2 H32 vertical bars anchored top and bottom.
    Laps to be 1400mm typical.
19. All masonry below ground level to be solid and continuous to all walls.
20. At the head of all non-loadbearing masonry partitions walls allowance should be made (e.g. soft joint) for 20mm vertical deflection of the floor above. Soft joints are to comprise Hydrocell compressible filler with all sealants and fire stopping to Architects detail. Allow for Ancon IHR head restraints @ 450mm horizontally c/c (shot fixed to structure above) complete with debonding sleeves.
21. Where masonry walls are built off suspended slab structure provide 3 courses of bed joint reinforcement to the bottom 3 courses.
22. Where steel beams bear onto masonry walls provide 440x215mm deep (min.) mass concrete (C30/37 to I.S. EN 206-1 Table 7 and max aggregate size of 10mm) bearing pad with 2No. M16 grade 8.8 cast-in holding down bolts u.n.o.

K. STAIRS & BALUSTRADES

1. The Contractor and/ or specialist sub-contractor shall include in their tender price for the preparation of design calculations, drawings & details of all balustrading, handrails and their fixings. The specialist design sub-contractor is to have full design responsibility for balustrading & handrails and shall provide evidence of professional indemnity insurance and collateral warranties. (as required)
2. For setting out of stairs, riser/going dimensions refer to Architect's details.
3. Stairs/landings/floors live loading is to be in accordance with I.S. EN 1991-1-1- based on the intended use of the stairs.
4. Horizontal loading on balustrades, handrails and the wall portion of balustrade is to be in accordance with I.S. EN 1991-1-1
5. Where balustrade & handrail infill comprises of tension wires the centres of wires should be such that a 100mm diameter sphere cannot pass through.
6. Refer to Architect's drawings/details for form/layout/dimensions of balustrade design intent.
7. Deflection of balustrades shall be limited in accordance with BS 6180 such that the total horizontal displacement of the barrier at any point from its original unloaded position should not exceed the deflection limits determined from the relevant structural design code (where applicable) for the material used, or 25 mm, whichever is the smaller.
8. Balustrades shall be designed for a vertical load as defined in Clause 3 of PD 6688-1-1:2011 This vertical load should be either a concentrated load of 1 kN or a uniformly distributed load of 0.6 kN/m, whichever gives the worst design condition in combination with the recommended horizontal loading.
9. Balustrade deflection checks should allow for rotation of the fixings which needs to be assessed as part of the entire balustrade assembly.
10. For handrail supported by glass balustrades, a post failure check shall be carried out of the handrail in the event of a panel breaking to ensure the hand rail can span between adjacent glass panels.

- THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DESIGN TEAM DRAWINGS AND SPECIFICATIONS.
- FOR SETTING OUT REFER TO ARCHITECT'S DRAWINGS. DO NOT SCALE THIS DRAWING. USE FIGURED DIMENSIONS ONLY.

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P01	02/08/24	SUITABLE FOR REVIEW/COMMENT	BP/MMcF	IC
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Client: TIPPERARY COUNTY COUNCIL

Project: TIPPERARY COURTHOUSE & BRIDEWELL

Title: GENERAL NOTES

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