APPENDIX 11-1

Historical and Archaeological Background

Prehistoric Period
Some prehistoric material has been identified in the study area. A number of burnt mounds have been identified at Castlemungret (L1013-222, L1013-223), Ballykeefe 1 (14F0253) and Skehadreggaun (E003928), ringing-ditches (E003928) and a prehistoric pit have also been identified at Skehadreggaun (04E0414)

Early Medieval Period
In the Early Medieval period the study area was situated in the cantred of Esclo and Loleger. In the seventh century this area was occupied by the Deis Tuascirt and the name Esclo is derived from Aes Cluana, a ruling family descended from Conall Mac Echach who lived about 800 AD (MacCotter 2008, 187). In the early part of this period St. Nessan, who died in 551, founded the monastery at Mun gret in the south-west of the study area. Classically settlement in the Early Medieval period is indicated by the presence of enclosed farmsteads known as ringforts. There are a number of enclosures in the study area in Tenvoe (L10004-021, L10004-022), Rathmale (L1012-018, L1012-019, L1013-002), Castlemungret (L1013-001, L1013-185) and Ballykeefe (L1013-010) and a souterrain in Skehadreggaun (L1013-242001) which date to the Early Medieval period. There was also a monastic settlement associated with the Early Medieval monastery at Mun gret (Baunacloka L1013-009) which was founded by St. Nessan in the sixth century. A range of kilns have been identified at Dromdarrig (15E0236) and Skehadreggaun (04E0414, E003928) as well as number of structures in Skehadreggaun (E003928) which probably date from the Medieval period.

Later Medieval Period
In the Medieval period much of the study area, including Castlemungret townland, was under the control of Mungret Abbey. In the twelfth century Mun gret Abbey joined the order of the Canons Regular of St. Augustine. Settlement at this period centered on the Augustinian Abbey at Mun gret but there is also a moated site known Moneteen (L1013-003) which probably enclosed the home of a secular lord. The fifteenth century was characterised by the decline of Anglo-Norman power in Ireland which had been ebbing since the early fourteenth century. Part of the response to this was the construction of masonry Tower Houses which sprang up after King Henry VI introduced a building subsidy of £10 in 1429 (Sweetman 1999, 137). There are the foundations only of a tower house in the study area at Castlemungret (L1013-006) which was the administrative centre of the episcopal manor of Mungret.

Post-medieval Period
In 1641 the townland of Castlemungret was held by the Bishop of Limerick and he retained the lands in 1670 (downsurvey.tcd.ie). A seventeenth century house in Skehadreggaun (L1013-224), a possible mill-race in Skehadreggaun (E003928) a standing stone in Conigar (96E0267) and a brick kiln in Conigar (02E1814) belong to this period.

Brady Shipman Martin
Appendix 11-2

Archaeological Excavations

[Text continues on the next page]
APPENDIX 11-2

Archaeological excavations in the study area

Clover Lodge, Baunacloka SMR 13:9 04E0196 No archaeological significance. Test-trenching in conjunction with an archaeological assessment was undertaken at Baunacloka, Mungret, in advance of the demolition of a house and the construction of a new house on the same site. The house site is located in the vicinity of the zone of archaeological potential for Mungret Abbey. Two trenches measuring 7.5m and 2.5m in length by 1.5m wide were excavated to the rear of the existing house. Nothing of archaeological significance was identified during the test-trenching.

Tracy Collins; Aegis Archaeology Ltd, 16 Avondale Court, Corbally, Limerick.

BGN Ballykeefe 1 14E0253 Burnt mound and charcoal production kiln. This site was discovered during monitoring along the route of the Bord Gais Networks Mungret to Inchmone Gas Pipeline, Co. Limerick. The excavation lasted for 2-3 weeks and was complete on 14 July 2014.

BGN Ballykeefe 1 was an extensive burnt mound with two large troughs and a large burnt mound deposit. A charcoal-production kiln was also identified adjacent to the burnt mound. The troughs contained well-preserved animal bone. Only a portion of this burnt mound was extant within the wayleave of the pipeline route and a portion survives in situ outside the wayleave. Post-examination works and the final report are due to be completed for this site in early 2016.

Fintan Walsh IAC Ltd, Unit G1, Network Enterprise Park, Kilcoole, Co. Wicklow

Conigar 96E0267 Standing stone. A standing stone threatened by an approaching quarry was investigated in April 1997. The stone stood in a shallow hollow which was infilled with stones cleared from the fields. Pottery and clay pipe fragments indicated an erection date no earlier than the 18th century. In August further investigations found medieval cultivation below the stone. The stone appears to be a scratching-post, erected during the post-medieval period to protect new enclosure walls.

Jo Moran and Dave Pollock, Arbour Hill, Fethard, Co. Tipperary

Castlemungret (BGE 4/3/1) 02E1735 Fulacht fiadh. See Appendix 4 L1013-222

Castlemungret (BGE 4/3/2) 02E1736 Fulacht fiadh and field ditch. See Appendix 4 L1013-223

Conigar (BGE 4/4/1) 02E1814 Brick kiln. See Appendix 4 L1005-105.

Mungret College, Dromdarrig, Mungret 15E0236 Non-Archaeological. An assessment (via test-trenching) took place of the proposed new Gaelscoil na Raithin and Mungret Educate Together National School at Mungret, Co. Limerick. Testing was carried out on behalf of the Department of Education and Skills, Portaloise Road, Tullamore, Co. Offaly at a pre-planning stage in order to confirm whether any archaeological constraints are apparent in relation to the site. The surrounding area contains a large number of recorded monuments and recent...
excavations in the vicinity highlighted the archaeological potential of the area.

The southern field (Field 1) is relatively flat with limestone rock very close to the surface. The northern field (Field 2) slopes from the old avenue leading to Globe House northwards towards the existing Mungrtet Road with the northerly part of the field consisting of marl.

On 25 and 26 May 2015 a total of thirty-three test trenches with a combined total of 1,541 linear metres (3082 sq. metres) were excavated. The trenches were excavated in all cases to natural deposits which varied from grey to pale cream marl at the north end of Field 2 to orange brown boulder clay with outcropping rock at the south end of Field 2 and throughout Field 1. The topsoil varied in depth from 0.2m to 0.5m but for the most part maintained an average 0.4m in thickness.

In Field 1 two features of archaeological significance were exposed. The first of these uncovered in Trench 1 appears to represent a keyhole-shaped kiln which contained evidence of in situ burning as well as inclusions of burnt stone, burnt clay and charcoal. The kiln measured 2m in length and 1m in width at the widest part. It may represent a kiln for drying corn but other functions could not be ruled out prior to full excavation. The second feature consisted of a small pit which was exposed in Trench 14 and measured 0.5m in diameter. It was filled with a brown clay containing some charcoal. An area measuring 10m by 10m was excavated around the two features to assess whether any further features were present but none were exposed. No other features of archaeological significance were exposed during the testing in Field 1 and the only finds recovered from the topsoil consisted of post-medieval pottery and glass.

In Field 2, the gas pipeline had previously been stripped along the east and southern boundaries and prohibited testing in these areas. The topsoil stripping of the route for the pipeline was monitored at the time and no features were exposed in this field. During the present testing a gravel path was exposed below the topsoil in Trenches 18 and 29. The path was aligned roughly east-west, measured 1.5m in width and had multiple inclusions of glass and modern pottery. It obviously represents an old path leading to the well or pump which is indicated on the 25-inch OS map (c. 1920). The path itself is not marked on any of the OS editions. No other features of archaeological significance were exposed in Field 2 and no finds other than the glass and modern pottery were recovered.

The kiln and pit exposed in Field 1 are of archaeological significance and both will require full excavation prior to the construction phase.

Linda Clarke Archaeological Consultancy Services Unit, Unit 21 Boyne Business Park, Greendhills, Drogheda, Co Louth

Monteen/Rathmale/Castlemungret 12EO038 No archaeological significance
Monitoring of the sewerage scheme and all associated works at Mungret Sewerage Scheme, Co. Limerick did not produce evidence for archaeological deposits or features.
Edel Ruttle TVAS (IRELAND) LTD, Ahish, Ballinruan, Crusheen, Co. Clare.

Skeha-creggan - Monastic settlement
The assessment work was done in 3 stages and for different reasons. The 1st was on the east side of the stream, in advance of a pumping station for Limerick County Council. The 2nd was to the west of the stream, in advance of a proposed Cerebral Palsy Workshop (see below), and the 3rd was to the east of the stream in advance of the relocated Workshop.

Nothing of archaeological interest was noted to the east of the stream which appears to have

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acted as a possible boundary because to the west of it several surface features were noted as well as deposits below the surface. There is a trackway extending along the western field boundary aligned north-south. This runs northwards from the road, on the opposite side of which is Mungret Abbey, to a site marked Templemungret. To the east of the track is a well, Toberpatrick. In the area bounded by the stream (to the east and north), the track (to the west) and the road, (to the south), there are linear undulations. A single cut was made in which pits, a possible stone feature, charcoal and bone were noted. Owing to their presence, although no datable finds were recovered, the work stopped and the site of the proposed workshop was relocated to the east of the stream to avoid fill-scale excavation. It is probable in view of the evidence that the section of the field to the west of the stream was part of the monastic settlement at Mungret.

Celie O Rahilly, c/o Planning Dept, Limerick Corporation, City Hall, Limerick

Skehacreggaun, Mungret 04E0414 Prehistoric pit
See Appendix 4 L1013-226.

Skehacreggaun, Mungret 04E0414 EXT Corn-drying kiln and holy well
See Appendix 4 L1013-225.

Ballykeefe A005/1030 Burnt stone spread
See Appendix 4 L1013-228.

Skehacreggaun E003928 Multi-period
A large-scale excavation was carried out on a Greenfield site to facilitate the construction of 147 residential units, apartments and crèche (54,347m²). The area for the development lies partially located within the zone of archaeological potential of Mungret Abbey (L1013-009). Nine specific sites were identified and excavated. These included four burnt mounds, two ring-ditches, two structures and kilns and a possible millrace. Preliminary analysis would suggest that the burnt mounds and ring-ditches belong to the Bronze Age, the structures and kilns to the 11th–13th centuries and no datable evidence was available for the possible mill-race.

Site 1 – structures and kilns

Rectangular structure
The remains of a rectangular structure were uncovered 35m to the north of the southern entrance to the development site along the centrally aligned access road. The structure measured 9.8m north–south by 5.5m (external) and was defined by an almost continuous, deeply cut but partially truncated foundation trench. The cut was U-shaped and had an average depth of 0.5m and varied in width to between 0.51m and 1.1m. The trench was filled with dark-brown lightly charcoal-flecked silty clay. The internal area measured 8.5m north–south by 3.2m and contained four post-holes and a pit with a similar charcoal-flecked silty clay fill. Seven post-holes, four stake-holes and seventeen pits were found scattered around the structure. Charcoal, animal bone, burnt bone, two bone combs, a whittle-tanged knife, bone handle and a well-preserved penannular brooch were recovered from the pits.

Corn-drying kiln (1)
A moderately preserved dumbbell-shaped kiln was found 10m to the west of the structure. The kiln was aligned north–south and had an overall length of 4.2m, a central width of 1.2m and a depth of 0.35m. The shallow bowl-shaped southern chamber had a diameter of 1.42m and a depth of 0.1m. The short flue extended into the deeper chamber at the northern end which had a

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diameter of 1.6m and a depth of 0.52m. The kiln was filled with dislodged limestone rubble and very little of the original stone lining remained in situ, but it did survive along the edge of the flue and around a small part of the northern chamber. The southern chamber was filled with a deposit of charcoal-rich silty clay that extended partially up the flue while the base of the northern chamber contained a shallow deposit of silty clay mixed with a small amount of animal bone.

Corn-drying kiln (2)
A second dumbbell-shaped kiln was found 2.5m to the south-east of the rectangular structure. This kiln was aligned north-east/south-west and had an overall length of 3.4m and. The north-east end was shallow, oval in shape and had an average diameter of 1.4m and a central depth of 0.26m. The interlinked nature of the two chambers meant that the central flue was largely absent but the ground level did slope from north-east to south-west. The chamber of the south-west end had a steep bowl-shaped profile 0.5m in diameter which then broadened out into a wider bowl shape with a diameter of 1.5m. The base showed clear signs of in situ burning which was surrounded by a ring of twenty tapered stake-holes with an opening on the north-east side facing the opposite chamber. This in turn was surrounded by several medium-sized stones set against a deposit of clay which were positioned around the upper broader part of the chamber. The central fill consisted of charcoal-rich silty clay mixed with traces of oxidised clay over which lay a similar deposit but with less charcoal that extended into the upper chamber. A small quantity of animal bone was recovered from this fill, but no datable material. The remainder of the kiln was filled with an ordinary build-up of silts and clays.

Stone structure 1
The poorly preserved remains of a stone building were found 9m to the north-east of the rectangular structure. The surviving portion of the building consisted of the east wall (L. 4.4m) and sections of the north and south walls (L. 4.2m and 1.9m). Only the lowest course of the wall remained in situ, which survived to a height of just 0.2–0.35m. The wall was 1m wide. The wall was built from large flat limestone slabs between 0.4–1.15m in length. Smaller stones were used to fill in the gaps. No entrance was visible. The foundations were left in situ. The internal area measured 4.6m north-south by 4.2m and contained four post-holes and eight pits.

Stone structure 2
The extremely fragmentary remains of the corner of a second building were found several metres to the east of the principal stone building under a large quantity of stone rubble and dark silty clay from which six fragments of a decorated single-sided bone were recovered. Only the foundation course survived to a height of 0.3m. The west wall measured 4.1m in length, 1m wide and was built using large flat limestone slabs with small stone insertions. The north wall was just 2.8m in length. These features were not fully excavated but left in situ. A large number of rubbish pits were found to the west of the stone structure. These pits were subrectangular in shape, 1–2m in length and had an average depth of 0.3m. The pits were filled with dark-grey charcoal-flecked silty clay from which animal bone, burnt bone, worked bone, iron slag, shell fragments and a small amount of burnt stone were recovered. A decorated and polished bone pin, a single-sided composite bone comb and a whittle-tanged knife were recovered from one pit. Two fragments of another single-sided composite bone comb were found in a second pit.

Site 2—burnt mound
The reasonably well-preserved remains of a burnt mound were uncovered slightly to the north of the main central area of the site just as the ground level started to rise above the low-lying poorly drained areas along the stream. The mound appeared as a very low grass area, roughly oval in

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plan, with overall dimensions of 15.6m east-west by 9.4m. It averaged just 0.35m in height. The principal features included the characteristic mound, a trough, numerous pits and scattered post-holes. The trough was located towards the centre of the site. The roughly rectangular-shaped pit measured 2.8m north-east/south-west by 1.45m and had an average depth of 0.25m. The sides were steep and broke gradually to a flat but uneven base. The fill of the pit largely consisted of dark-grey charcoal-flecked clayey silt with heat-cracked stone. No timbers survived in the trough but eight stake-holes, two in each corner, were found. The stake-holes (diameter 0.08–0.11m) were circular or oval with tapered profiles and were filled with the same dark-grey charcoal-flecked clayey silt. A cluster of pits was found 10m to the north of the trough, each containing charcoal-flecked silty clay and occasional fragments of animal bone.

Site 3 – burnt mound
This site measured 25m east-west by 8m and was uncovered during topsoil stripping in an area north of the central stream and close to the western boundary of the development. The site was characterised by shallow deposits of burnt and unburnt stone, mixed deposits of charcoal-flecked silts and clays, a trough and several associated pits and post-holes. The large accumulation of heat-cracked stones commonly associated with fulacht fiadha or burnt mounds was absent. The centrally-located square-shaped trough had a funnel-shaped profile, partially cut through the underlying limestone bedrock. The upper portion measured 3.8m north-south by 3.05m, which tapered steeply down to a rectangular cut 0.45m by 0.55m. The total depth was 1.45m. The east and west sides of the trough were formed by large rounded boulders protruding from the surrounding clay and the underlying upright slabs of limestone. The north and south sides were created by simply cutting into the clay. Essentially, this created a small rock pool fed by an underground natural spring which still provided a considerable amount of water. The remaining features consisted of a few pits scattered around the trough and filled with heat-cracked stones. No finds were recovered.

Site 4 – burnt mound
The remains of a large spread of burnt and unburnt stone were found during topsoil removal to the south of the stream. There were no obvious signs of a low mound prior to excavation. The area measured 25m east-west by 14m and extended outside the limits of the excavation to the south. As the area was not affected by this phase of construction works, it was decided to recover the site under a layer of geotextile and topsoil and preserve the remains for future investigation.

Site 5 – burnt mound
The remains of a large spread of burnt and unburnt stone were found during topsoil removal in the adjacent field to the west. There were no obvious signs of a low mound prior to excavation. The area measured 15m east-west by 6m and extended outside the limits of the excavation. As the area was not affected by this phase of construction works, it was decided to recover the site under a layer of geotextile and topsoil and preserve the remains for future investigation.

Site 6 – ring-ditch
The remains of partially preserved circular structure were uncovered on a flat low-lying area close to the centre of the site to the north of the main stream. Approximately two-thirds of the structure survived, the remainder was truncated by the later mill-race and by a series of plough furrows and modern drains. The surviving portion of the structure measured 13m east-west by 14m and was defined by a single concentric ditch cut into the underlying natural clay. There was no trace of a bank and no evidence for an entrance, although the entrance may have been in the destroyed south-west quadrant of the structure. The enclosing ditch was quite irregular and uneven, but in
general it had a broad U- to V-shaped profile, 0.38–1.3m wide and 0.22–0.35m in depth. The western section was deeper and more regular than the eastern section which was shallower and poorly defined. The enclosing ditch contained twelve deposits of silts, sands and clays mixed with a small quantity of charcoal. The internal area of the structure was relatively flat and measured 11.1m east-west by 11.5m. A single slightly irregular tear-dropped shaped pit was located in the northeast corner, but was unfortunately bisected by a modern drain. The pit had an overall length of 1.82m. The more easterly bowl-shaped end had a diameter of 1.25m and a central depth of 0.5m. There was clear evidence of in situ burning within the cut as the base and sides were scorched a reddish-orange.

Site 7 – ring-ditch

The remains of a partially preserved ring-ditch were uncovered on a flat low-lying area in the vicinity of the site close to the southern edge of the stream. The northern edge of the structure had been gradually eroded by the slow meandering changes of the watercourse. Further damage was caused during the construction of the mill-race and by later agricultural activity. The surviving section of the site measured 10.5m east-west by 11.5m and was defined by a single-concentric ditch. It extended into the underlying natural clay. There was no trace of a bank. The entrance to the structure was formed by an uncut causeway 2.1m in width and facing west. The enclosing ditch was shallow, with a broad U-shaped profile 0.28–0.95m wide and 0.05–0.09m in depth. The ditch continued in profile, the inner of which consisted of soft, lightly charcoal-flecked grey/blue clay, and the outer, dark grey silty clay with occasional small stones. The internal area of the structure was relatively flat and measured 9.55m east-west by 9.35m. A single pit was located towards the centrer. The pit was roughly oval with a bowl-shaped profile (L. 0.9m, W. 0.73m, D. 0.18m). The sides and base of the pit showed clear signs of in situ burning. No finds were recovered from the pit.

Site 8 – possible mill-race

The remains of a probable tail-race of a mill aligned east-west extended across the central area of the site along the northern side of the main stream. The exposed section measured 12.8m and truncated the two possible ring-ditches further to the west. The remainder was outside the limits of the excavation but a preliminary investigation of the unexcavated section suggested it linked up with the stream. The eastern end was truncated by the north-south-aligned stone wall and path leading from Templemungarret to Mungret Abbey.

The cut for the tail-race had a broad U-shaped profile with an average width of 2.2–3.35m and depth of 0.93m. The extreme eastern end was slightly funnel shaped, created and enhanced by constructing a 0.95m section neatly lined with large slabs of cut limestone. A large quantity of stone rubble had to be removed first to expose the base slabs before each side was revetted with between two and five courses of roughly hewn stone. The stone survived to a maximum height of 0.98m. The size of the stones varied considerably from 0.4–1m in length. Evidence of later repair work was visible along a 1m-section of the northern side. The section closest to the wall was badly damaged during the latter’s construction. Three stone steps, cut into the surrounding clay along the southern side, provided access down into the base of the tail-race.

During the removal of collapsed stone rubble from the waterlogged eastern end of the tail-race, several timbers were found. Two long wooden stakes, one on each side of the tail-race 1.5m from the eastern end, were positioned between the base and side wall and driven deeply into the underlying clay. A third timber lay horizontally across the tail-race resting just over the two stakes but was not firmly fixed in place by them. This long rectangular timber, which had partially split
down the middle, had three to four perforated holes spaced 0.2m apart along half of its length. There was a suggestion of additional holes were the timbers had split but due to the poor level of preservation further analysis will be required. All three timbers were sealed within a deposit of compact dark grey silty clay that contained small shell fragments.
John Kavanagh, Leon Archaeology Ltd, Carlow, Co. Carlow.

Mungret (Site I) 07E0350
See Appendix 4 LI013-241.

Mungret (Site II) 07E0351
See Appendix 4 LI013-241.

Skehacreggaun 07E0369 Souterrain
The site at Skehacreggaun, Mungret, is 75m north-west of an ecclesiastical complex (LI013–009) and 125m east of a castle site (LI013–006). The site works were undertaken in June and July 2007 prior to a residential development on the site. The site comprises undulating pasture with limestone outcropping evident in the north of the site and bog evident in the south. Fifteen parallel test-trenches were excavated at intervals of 8–11m. The trenches totalled 2433m. All fifteen trenches contained some archaeological material. Thirty-eight individual features were identified. These features comprise a souterrain, a possible kiln, 26 pits and ten linear features. These 38 features have been summarised into eight groups.
Group 1 contains two pits in the north-west of the site. The pits are adjacent to each other, suggesting a common function. Group 2 comprises a single linear feature aligned east–west and extending over six trenches in the centre of the site. The feature is probably a relict field boundary. Group 3 is two pits in the west of the site.

Group 4 is two pits and two linear features, extending over three trenches in the north of the site. An arc was extrapolated from one of the linear features which produced a diameter of 37m. This group may represent an enclosure located at the highest position of the site. Group 5 is similar to Group 4. A similar arc was extrapolated from a curvilinear feature that produced a diameter of 20m. This group of features was located to the east of Group 4 in the north-east of the site. Group 6 includes three pits and a linear feature in the east of the site.

Group 7 is a souterrain, a possible kiln, associated pits and a linear feature. These features were located in the centre of the site. The souterrain was identified by an intact 'drop-hole' with a chamber extending northwards. No further investigation of the souterrain was conducted. It is assumed that the pits, kiln and linear feature are associated with the souterrain activity. Group 8 is similar to Groups 4 and 5. A circle was plotted based on three pit-type features. Should these small pits comprise post-holes (the remnants of upright wooden posts) it is probable that a circular hut-type structure with an estimated diameter of 10m is represented.
Goorik Dehaene, Coolroe, Tinahely, Co. Wicklow, for Gregory Consultant Archaeology Ltd.
Appendix 11-3

Recorded Monuments in the Study Area
APPENDIX 11-3

Recorded Monuments in the study area

LI0004-021 Enclosure Tervoe
No further information in RMP file.

LI0004-022 Enclosure Tervoe
No further information in RMP file.

LI012-018 Rathmale Enclosure
No further information in RMP file.

LI012-019 Rathmale Enclosure
No further information in RMP file.

LI012-123 Conigar Redundant Record
Excavation by Jo Moran (96E0267) revealed this to be a recently erected scratching stone and therefore outside the remit of the Archaeological Survey of Ireland.

LI012-124 Enclosure Tervoe
RMP file not available.

LI013-001 Castlemungret Enclosure
Situated in level, heavily quarried grassland, covered in places with dense scrub. The monument is indicated on the current OS 6" map as a sub-oval platform (c. 20m N/S by 10m E/W) with the E scarp incorporated into a field boundary. The monument has been destroyed by quarrying.

LI013-002 Rathmale Enclosure
Situated on flat ground on a garden boundary, c. 30m S of two houses. Indicated on the 1924 OS 6-inch map as a partial sub-rectangular platform (diam, c. 30m N-S by 40m E-W), bisected by a field boundary running N-S. The majority of the enclosure lies E of the boundary and is indicated by hachures as a platform. The remainder, to the W of the boundary, is indicated by a line. The monument has been levelled, however traces of the W arc (12m E-W) of an enclosing bank (int. H 0.3m; ext. H 0.3m; Wth. 0.5m) is evident.

LI013-003 Moneteen Moated Site
Situated immediately W of a field boundary, in level pasture. The monument is masked by dense scrub vegetation cover. A sub-rectangular platform (26.7-34.5m N-S; 19.7-26m E-W), best preserved from W to NE and from SSW to E, surrounded on four sides by a fosse (Wth 1.8m; ext. D 0.2m; int. D 0.5m). The fosse on the E side has been encroached on by a now-dilapidated field wall. The platform is slightly shallower on the E side which might represent an entrance. Barry (1981a, 84; no 30) lists this as a moated site.

LI013-006 Castlemungret Castle
"The castle, which was the administrative centre of the episcopal manor, is now completely destroyed. It was located on a low rise to the north west of the churches. On the site there are a series of low walls, up to 1.5m high, most of which are probably modern but some may be part of the original L-shaped castle shown on the map. One corner has long and short quoin corners."

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L1013-009  Baunacloka Settlement Deserted

"Mungret is located three miles west of Limerick city on the Foynes road. The name appears to mean 'bog or sedgy morass of the sloping hill'. Mungret was one of the most important Early Christian monasteries in north Munster. Founded, apparently in the sixth century, by St Nessan its abbots are recorded from the middle of the eighth century and this provides a clear indication of its significance by this time. The monastery was raided on a number of occasions between the tenth and twelfth centuries. In 1152, at the Synod of Kells, it claimed to be recognised as an episcopal seat. This claim was presumably based on its historic role as the principal church of the diocese of Limerick. Its proximity to the town of Limerick, however, meant that it was unable to make good its claim. It has been suggested that the Augustinian Canons may have established a house here during the twelfth century but documentary evidence is lacking. At the close of the twelfth century the land of Mungret was granted to St Mary's, Limerick, by Domhnall Mor O Briain and subsequently it was to be part of the estates of the bishop of Limerick. After the coming of the Normans Mungret functioned as an episcopal manor and was granted the right to hold a weekly market in 1225. A rental of the manor, prepared in 1336, survives in the Black Book of Limerick. It states that the burgesses then rendered £4 10s annually to the bishops for the land they held. Further evidence that the settlement was a borough is provided by an entry in the statute rolls of 3 Edw IV (1463-4) which indicates that the borough had been granted the laws of Breteuil. The subsequent history of the borough is unknown but it is to be presumed that it shared the same fate as many of the other medieval boroughs in the county by falling prey to the ravages and famines of the mid fourteenth and fifteenth centuries. The medieval borough is likely to have been centred on (and to the north of) the cluster of churches which survive on the south side of the Foynes road.

L1013-009001 Baunacloka Church

"A simple rectangular church located immediately south of the Foynes road. It measures 12.35m north/south by 6.95m east/west internally. The walls are virtually intact; the north and south walls are c. 4.5m high and the east and west gables c. 9-10m high. The church is set on a plinth 18cm wide and up to 45cm high. The quoins are mainly limestone but some are of dressed sandstone. The masonry is coursed limestone rubble. The building cannot be assigned a precise date but is possibly pre-Norman. The east wall has a round headed window, c. 50cm wide and 110-120cm high; splayed, with rounded rear arch. There are no dressed stones but the inner and outer angles of the reveals have roughly dressed sandstone and limestone blocks. Below this is a blocked flat lintelled doorway, slightly splayed. This is not visible externally as the outer wall face is clearly rebuilt. The north wall is featureless. The south wall seems to have had two windows, both blocked and neither visible externally. Internally the round rear arch of the western window is visible while one splay of the eastern one can be seen. The west wall has a flat lintelled door with inclined sides. There are two lintels; the outer one is a large block of very dark grey limestone roughly dressed and 2.33m long, 40cm high and 52cm thick. The inner one is modern. The outer jambs of the door are large blocks of sandstone and limestone but the inner jambs are modern."

L1013-009002 Drumdarrig Church

"This church is located in a small graveyard east of Church C ("the abbey") and south of Church A. It measures 8.6m north/south by 4.1m east/west internally and the masonry consists of large coursed limestone blocks with dressed limestone quoins. It is set on a plinth c. 25cm wide and 15cm high. The east gable is almost intact, c. 6.5m high with a tall splayed very narrow pointed window with limestone jambs and pointed rear arch (?modern). The north and south walls were originally c. 3.5m high but are now broken down especially at the west end. The south wall has
two tall narrow splayed windows which are missing their arches and rear arches. The west wall has an unsplayed doorway which may be modern. Like Church A the building cannot be assigned a precise date but it is possibly of pre-Norman origin.

L1013-009003 Drumdarrig Graveyard
Situated immediately E of a public road, overlooking gently undulating pasture. Sub-rectangular area (30m NW-SE; 20-30m NE-SW) enclosed by a mortared stone wall (int. H 0.9m; ext. H 1.4m). In the N half of the site is a ruined stone church (L1013-009002). Several grave plots share the orientation of this church NW-SE, but there are also others which are orientated E-W. The graveyard is still in occasional use.

L1013-009005 Drumdarrig Church
Situated in a graveyard in Dromdarrig townland, this consists of a chancel, nave and residential tower at the west end. The chancel is of thirteenth century date, the residential tower is of fifteenth century date but the date of the nave cannot be determined: Leask (1933) terms this building "the abbey" but as there is no evidence for the existence of an abbey at Mungret in the thirteenth century, it seems more correct to regard it as the parish church of the medieval borough. Lewis (1837, ii, 415) states that there was a tower and gateway some 300 yards to the east of the graveyard but it is unclear whether this was part of the ecclesiastical complex or not.

The north and south walls of the CHANCEL appear to have been refaced in the fifteenth century and the east wall alone retains its original thickness. The gable is c. 7.5m high and is built of roughly coursed rubble limestone. The north and south walls have been thickened by the addition of some 50-60cm to their external face and are built of roughly dressed and coursed limestone masonry with a basal batter c. 1.5m high externally. They are c. 4-5m high internally with a later parapet on average some 50-70cm high but surviving up to 1.5m in places. Drainage chutes project externally. The east window is a pointed twin-light with chamfered and rebated jambstones of red and brown sandstone, splayed internally and having a pointed rear arch with chamfered sandstone jambs while the embrasure itself is outlined with sandstone jambs. The mullions are of modern limestone. The north wall has a small round headed splayed window with limestone jambs (blocked by later external thickening) which lacks its rear arch. The west end of the wall has additional thickening to accommodate a mural stairs rising to a gallery or loft over the west end of the choir. The stairs were originally entered from the nave through a flat lintelled door in the north east internal angle; this is now blocked and the stair well (stairs missing) is now entered through a large opening in the north wall of the choir. The stairs are lit at gallery level by a small rectangular loop in the external north wall. The gallery is entered from the stairs through a rectangular door with dressed limestone jambs in the north wall opposite this in the south wall at gallery level another opening led to a mural chamber in the west end of the south wall (similarly thickened externally). This has a garderobe at the west end and is lit by large and small rectangular loops in the external south wall. The south wall has a trefoil headed piscina with chamfered sandstone jambs and sill (missing its bowl) and four splayed lancet-like windows which are blocked by later external facing. The first from the east had a pointed rear arch; the second was a single light with pointed rear arch and sandstone jambs; the third was a twin-light window with shouldered head and chamfered limestone jambs set within a rectangular opening with dressed limestone jambs in the external wall face and a lintelled rear arch. The fourth has a narrow pointed light with limestone jambs, now blocked. The cross-wall, c. 8m high, is gabled with the coping stones of the original chancel still visible. It was subsequently widened when the north and south walls were thickened. At ground level there are three voussoirs for a doorway most of which has been replaced by a large unsplayed opening c. 4-5m high.
The masonry of the NAVE consists of roughly coursed rubble limestone with limestone quoins (three are sandstone). The north and south walls are c. 3.5m high and the east and apart from the large modern opening already mentioned, and it seems to be largely rebuilt. The north wall has a tall parallel sided door, missing its arch but with a segmental rear arch, roughly centrally placed. Three-quarter round limestone shafts, c. 1.5m high on the external angles of the reveals are apparently inserted, and not in their original position. East of the door is a narrow rectangular window/loop with undressed limestone jambs, splayed with flat lintelled rear arch. The south wall has a large rectangular door, now blocked, with a relieving arch above, roughly centrally placed with a window to either side. That on the east is rectangular, with limestone jambs (undressed) and is splayed with flat lintelled rear arch. That to the west is now blocked, but another splayed loop, missing its arch and rear arch has been inserted above; this appears to be contemporary with the loft over the west end of the nave and connected with the residence to the west.

The RESIDENTIAL TOWER is a gabled building of two floors, oriented north-south, with a belfry some 12.5m high on the north. The south gable is 7m high and the west wall c. 4m high. The masonry is roughly dressed and coursed limestone with dressed limestone quoins. It is entered by two doors at its east end. At the north end of the west wall of the nave is a flat lintelled door with dressed limestone jambs giving access from the nave, while the other door, now blocked, is located in the external south wall of the nave. It is also flat lintelled and has chamfered limestone jambs with pyramidal stops and an angled flat lintelled embrasure in the south-east angle of the residence. The east wall also has, at ground level, a flat lintelled recess with inclined sides, possibly a blocked west door of nave. Base of one side has a chamfered limestone jamb, possibly inserted. The north wall has a small rectangular splayed loop with chamfered limestone jambs and flat rear arch. The south wall has a small rectangular splayed window with shouldered head and chamfered limestone jambs and flat lintelled rear arch. There is also a blocked unplayed embrasure with flat lintelled rear arch, probably a blocked window or door, although there is no sign of it externally. The west wall has a small recess and a blocked unplayed embrasure with flat lintelled rear arch, probably a blocked window, though not visible externally. The first floor was supported on corbels in the north and south walls and put-logs in the west wall (none visible in the east wall). The west and east walls have tall flat lintelled doors, now blocked. The north and south walls have splayed rectangular windows with chamfered limestone jambs and flat lintelled rear arch. There is a chimney flue in the east wall at a high level although it is not clear where the fireplace was. The belfry is a narrow tower, c. 12.5m high of four floors with parapet above. The masonry is roughly dressed coursed limestone with large dressed limestone quoins and a cavetto string course between the 2nd and 3rd and 3rd and 4th floors externally. It is entered through the door in the embrasure in the north-east angle of the residence. A straight stairs rise to a small flat lintelled chamber c. 2m above ground level lit by a small splayed rectangular loop in the north wall. The first floor was apparently entered only from outside the church through a flat lintelled door with dressed limestone jambs in the east wall although there is a possible blocked door in the south wall leading to the first floor of the residence. The second, third and fourth floors were apparently of timber supported on ledges in the internal walls and communication was presumably by internal ladders. The second floor is featureless. The third floor has a large rectangular opening with dressed limestone jambs, now blocked, in each wall. The fourth floor has rectangular windows with chamfered limestone jambs in each wall, those in the south and west walls are damaged and there appears to have been a parapet above."

LI013-009006 Skehacreggaun Ritual site – holy well Situated 4.5m E of a field boundary, in flat pasture. The monument is heavily masked by scrub
vegetation. The monument is a rectangular depression (L. 3.4m, N-S; Wth. 2.6m, E-W) much obscured by bramble overgrowth. The first two in a series of steps (L. 0.5m; Wth. 0.2m; D 0.3m) are visible in the N edge of the depression descending from N to W. The well has been filled in with rubble to a depth of c. 0.7m from ground level. The well was archaeologically excavated in 2005 but no dating evidence or associated artefacts were recovered.

LIO13-009007 Skehacreggana Excavation - miscellaneous
In 1992, as part of an archaeological assessment by Celine O Rahilly, a single cut was made in which pits, a possible stone feature, charcoal and bone were noted. Owing to their presence, although no datable finds were recovered, the proposed development was relocated and the site backfilled. These features are probably associated with the nearby monastic and urban settlement of Mungret (Co013-009).

LIO13-009008 Bajnaeloka Ecclesiastical site
"Mun'gret is located three miles west of Limerick city on the Foynes road. The name appears to mean 'bog or sedgy morass of the sloping hill'. Mungret was one of the most important Early Christian monasteries in north Munster. Founded, apparently, in the sixth century by St. Nessan its abbots are recorded from the middle of the eighth century and this provides a clear indication of its significance by this time. The monastery was raided on a number of occasions between the tenth and twelfth centuries. In 1152, at the Synod of Kells, it claimed to be recognised as an episcopal seat. This claim was presumably based on its historic role as the principal church of the diocese of Limerick. Its proximity to the town of Limerick, however, meant that it was unable to make good its claim. It has been suggested that the Augustinian Canons may have established a house here during the twelfth century but documentary evidence is lacking. At the close of the twelfth century the land of Mungret was granted to St Mary's, Limerick, by Domnall Mor O Briain and subsequently it was to be part of the estates of the bishop of Limerick. After the coming of the Normans Mungret was used as an episcopal manor and was granted the right to hold a weekly market in 1225. A rental of the manor, prepared in 1336, survives in the Black Book of Limerick. It states that the burgesses then rendered £4 10s annually to the bishop for the land they held. Further evidence that the settlement was a borough is provided by an entry in the statute rolls of 3 Edw IV (1463–4) which indicates that the borough had been granted the laws of Breteuil. The subsequent history of the borough is unknown but it is to be presumed that it shared the same fate as many of the other medieval boroughs in the country by falling prey to the ravages and famines of the mid fourteenth and fifteenth centuries. The medieval borough is likely to have been centred on (and to the north of) the cluster of churches which survive on the south side of the Foynes road.

LIO13-010 Ballykeefe Enclosure
Situated on the E down-slope of a low hill which slopes more sharply to the E of the possible site location. The monument is indicated on the 1924 OS 6-inch map as a small circular enclosure (diam. c. 10m) planted with trees. Several collections of stones (dim. 0.3 x 0.5 x 0.2m) in small hummocks (diam. 2-3m) are evident in a roughly rectangular area (c. 17m N-S).

LIO13-147 Castlemungret Standing Stone
The site could not be located.

LIO13-148 Moneteen Standing Stone
The site was not located.

Brady Shipman Martin
Appendix 11-4

Monuments included in the Archaeological Survey Database
APPENDIX 11-4

Monuments included in the Archaeological Survey database in the study area

LI005-075  Bunlicky Enclosure
Archaeological Survey file not available.

LI005-105  Conigar Kiln - brick
The site was exposed during the monitoring of topsoil-stripping along the Bord Gáis Éireann Barnakyle to Coonagh West gas pipeline (No. 1128, 02E1649). It lay on flat, low-lying pastureland c. 80m north (sic) of the Shannon River. It was initially identified as a concentrated spread of brick fragments, burnt clay and charcoal; measuring 10.5m (east–west) by 7m.

After cleaning of the area, eight lines or rows of brick-based material emerged, aligned roughly north-west/south-east and spaced 0.5–0.7m apart. The lines continued to the north, beyond the limits of the Bord Gáis Éireann wayleave. These rows measured c. 4m in excavated length (north–south) and were c. 0.4m wide. The surviving deposits, no more than 0.1m deep, consisted of soft, grey/black soil and varying amounts of crushed brick fragments. Several larger pieces of brick were sampled for study. A number of in situ brick outlines were visible as rectangular impressions in the soft, blackened clay, illustrating how the bricks were stacked rows. The spaces between the brick rows were heavily oxidised, with evidence of intense scorching/firing of the ground, confirming the site as the remains of a kiln. The site was generally very poorly preserved and was found to be ripped by mechanical excavator markings, aligned east–west, indicating that the ground had been levelled at some point, probably during a phase of work on the Shannon embankment, 400m north of the site.

The brick kiln at Conigar is similar to one found by Donald Murphy during work on the Portumna Sewerage Scheme in 1998 (Excavations 1998, No. 263, 98E0386), dated by the excavator to the 17th century. Another 'brick clamp' (temporary kiln) of this was excavated on the Bord Gáis Éireann Pipeline to the West project in 2002 by Graham Hull (see No. 1164 below, 02E0557, BGE 3/67/4, Dollas Upper). The 1840 edition of the OS map shows that the site was on the edge of a 'brick field'. Brick fields or 'brick holes' are also shown farther east on the same map, in Castlemungret, Bunlicky, Ballykeeffe and Ballinacurra (Hart). The discovery of the temporary kiln at Conigar confirms that on-site production of bricks occurred simultaneously with the quarrying of raw materials, and the excavated kiln may date from the 19th century.

Ken Wiggins, for Margaret Gowen & Co. Ltd, 2 Killiney View, Albert Road Upper, Glenageary, Co. Dublin.

LI013-185  Castlemungret Enclosure
Archaeological Survey file not available.

LI013-222  Castlemungret Fulacht Fia
The site was exposed during the monitoring of topsoil-stripping along the Bord Gáis Éireann Barnakyle to Coonagh West gas pipeline (No. 1128 above, 02E1649). It lay in a low, gently sloping field near the edge of bogland, c. 500m west of the medieval churches at Mungret (SMR 13:9). It was excavated between 22 November and 5 December 2002. The site was initially identified as a circular spread of charcoal-rich clay, c. 4.5m in diameter, containing dense burnt stone fragments. The limits of the site were concealed by natural grey sediment up to 0.25m thick. Most of this was mechanically excavated to reveal the edges of the spread before full excavation.
There was a stone culvert aligned south-west/north-east at the north-western corner of the site. A pit-like feature was situated close to the western edge of the spread. It was 1.17m long, 1.1m wide and 0.45m deep. The fill comprised two deposits: a lower deposit of grey/brown silty clay, large sandstone blocks, numerous burnt stone fragments and spots of charcoal, and an upper deposit of dark grey, silty clay, charcoal, ash and burnt stone fragments. A second cut was a linear feature close to the northern limit of the burnt spread. It had an excavated length (north-west/south-east) of 1.75m and was 0.75m wide and 0.22m deep. The fill was grey/pale grey, silty clay. The fully exposed burnt stone spread measured 8.5m (north-south) by 5.5m and was up to 0.25m thick. A short curving channel in the boulder-clay surface was found directly underneath the spread. This feature was 2.7m long (south-west/north-east), up to 1m wide, and up to 0.5m deep on the western side.

Ken Wiggins, for Margaret Gowen & Co. Ltd, 2 Killiney View, Albert Road Lower, Glenageary, Co. Dublin.

LI013-223  Castlemungret Fulacht fia
The site was exposed, during monitoring of topsoil-stripping along the Bord Gáis Éireann Barnakyle to Coínagh West gas pipeline (No. 1128 above, 02E1649), on a slight rise above bogland 230m north of BGE 4/3/1 (No. 1143 above, 02E1735). It was initially identified as a series of large patches of dark, charcoal-rich clay and burnt stones. The full dimensions of the site were 13m (north-south) by 7m. Excavation took place from 4 to 9 December 2002.

A number of cuts were identified in the subsoil. The largest of these was a field ditch aligned east-west, dividing the site into two halves. A wide but shallow pit-like feature, 3.3m in diameter and up to 0.22m deep, was situated on the northern side of the ditch. The fill was dark grey, charcoal-rich clay, containing numerous burnt stone fragments. There was a thin, amorphous spread of burnt stone material on the southern side of the ditch, 3.3m long (east-west), 1.8m wide and up to 0.06m thick. There were two cuts on the southern side of the ditch. One was 2m long (north-south), 1.35m wide and 0.24m deep and the other was 1.5m long (east-west), 1.2m wide and 0.25m deep. The fill consisted of a basal layer of black, charcoal-like clay, with numerous burnt stone fragments, and an upper deposit of grey silty clay and gravel.

The ditch forming the centre of the site had an exposed length of 8m (east-west). It was 0.65m deep and typically 2.4–3.2m wide. However, there was an expansion on the southern side, increasing the width to 3.7m. The ditch was not excavated in full, as it was of relatively recent origin. It was backfilled with grey/brown, topsoil-type clay, containing brick fragments, over a primary fill of dark grey, silty clay, containing stone and animal bone.

Ken Wiggins, for Margaret Gowen & Co. Ltd, 2 Killiney View, Albert Road Lower, Glenageary, Co. Dublin.

LI013-224  Skehacreggaua House – 17th century
Marked on OS 6-inch maps as ‘Skehacreggaun House (in ruins)’ and therefore may be an early house.

LI013-225  Skehacreggau Kiln – corn-drying
An assessment, including testing and monitoring, was requested by Limerick County Council in advance of a housing development at Skehacreggau, Mungret. The development site is situated close to Mungret ecclesiastical complex, and St Nessan’s Church, possibly dating to the 10th century, is within view. The monitoring of groundworks (Excavations 2004, No. 1030) led to an
extension of the licence in order to excavate a small pit and a corn-drying kiln:

The kiln construction was represented by two conjoined cuts; a drying chamber and flue, respectively. The drying chamber was sub-rectangular, 2.22m by 0.46m by 0.37m, and orientated east–west. The sides were steep to vertical and broke gradually to a flat, but irregular base. The remaining depth of the cut, after modern truncation was 0.37m. Five fills were recorded in the cut. Seven stake-holes were positioned at the internal corners of the drying chamber and were found underneath a charcoal/ash layer. The stakes would presumably have supported a rack on which cereal grains, etc., could have been dried. They may also have supported outer walls or coverings. The flue consisted of a linear cut, 3.57m long, which extended south from the drying chamber. It was severely truncated by ploughing and only a depth of 0.12m remained implaces. Where best preserved, the flue was 0.61m deep and 0.32m wide. There was no evidence of the flue lining and the base was concave. As the flue ran north the base rose sharply; c. 0.4m, from the drying chamber. This can only have acted as a baffle to prevent the continuation of sparks into the chamber. There was no evidence of in situ burning or a firing area within the flue. The absence of a definable hearth area within the flue and the location of the stake-holes within the drying chamber would all appear to suggest a trial or prototype kiln. The kiln may not have been effective at this location, or perhaps the flue was aligned erroneously, thus leading to the change in position of the flue. The absence of a firing area would seem to support this hypothesis. The kiln is likely to date to the medieval period, on grounds of morphology, and radiocarbon dates are forthcoming.

Two cuts were made prior to the construction of the kiln. The first of these was sub-rectangular in plan with rounded corners and measured 3.38m by 0.62m by 0.36m. It had five fills, four of which had charcoal inclusions. An animal tooth was recovered from one of the fills. It is possible that the upper fills of the cut relate to the later construction of the kiln flue, whether they served to stabilise the ground here or were directly upcast from the cut. There was no evidence to suggest that this pit had remained open for any significant period of time or that it had served any clear function before being backfilled. The second pit cut was similar and was truncated by the drying chamber cut at its southern end. While irregular in plan, a general north–south orientation was discernible and it measured 1.2m by 0.76m by 0.18m. The single fill of this cut contained charcoal flecks and fragments of animal bone. The relationship between this cut and that of the drying chamber was not altogether clear and so could be interpreted in two ways: that the drying chamber is later and cut through this pit or that both cuts are contemporaneous but this pit was backfilled and disused.

An isolated circular pit was recorded c. 25m south of the kiln, measuring 0.3m in diameter, with a maximum depth of 0.15m. A chert scraper was included in the fill.

A holy well, Toberpatrick, SMR 13:9, was also located within the development site and investigative works were undertaken to decide a strategy of mitigation/conservation for it. The well was in a dilapidated condition, surviving as a depression filled with loose stones and debris which was heavily overgrown. O’Connor (2003) states that in the past a low wall had surrounded the well, evidenced by a photograph taken in 1907, but the wall no longer exists. The well is near to the western boundary of a field where a relict pilgrim path had run between Mungret Abbey and Templemungret. A painting called Blind Girl at the Holy Well by the 19th-century artist Frederick Burton, whose father owned land immediately south of Mungret Abbey, was reportedly inspired by Toberpatrick and may provide evidence of the ‘cures’ or traditions associated with the well.

Brady Shipman Martin
The sod was removed back from the well walls in two locations and showed that the original cutting of the well was c. 1m wider than where the walls were built. It appeared that, once the walls had been built, larger limestone was backfilled behind them. Therefore, the well is a roughly square revetted void that contains a smaller subcircular holy well, with internal measurements of 2.4m by 2.8m, on its western base. All stones used in the construction were of local grey sandstone, and varied in size. The walls of the holy well survived to varying degrees. The well was cleared to a maximum depth of 1.25m. It was best preserved in the south-western side, where up to seven courses were visible. No artefacts were recovered from the material that was removed from the holy well void. Furthermore, no secure ecofactual evidence was discovered and as a result the date of holy well construction, use and disuse remain unknown. The holy well site probably originates from domestic usage in the medieval period due to its proximity to the ecclesiastical complex, only later to develop into a site with religious significance. Alternatively, it could hold origins earlier than the medieval period, as many such sites held pagan significance long before the coming of Christianity.

Jacinta Kiely, Eachtra Archaeological Projects, Ballycurreen Industrial Estate, Kinsale Road, Cork.

LIO13-226 Skehacreggaun Excavation - miscellaneous

An archaeological assessment with testing was carried out in advance of construction of 97 housing units. The development site was located in Mungret and is composed of three fields. Two archaeological sites are near the development site, an enclosure (SMR 13:10) to the west and the Mungret ecclesiastical complex (SMR 13:9) to the south. A trackway marked on the first-edition OS map is visible on the western boundary of Field 2.

Twenty-eight trenches were excavated within the site. They were laid out on a 20m grid square system. All trenches were 2m wide and were excavated onto the subsoil. The topsoil was 0.2–0.5m in depth and the subsoil was a mix of grey and orange/brown clay. Limestone bedrock was recorded in the central section of the site. A single small pit was recorded in Trench 6 in the central portion of the site. A polished chert scraper was included in the fill. The trench was extended in the area of the pit.

No further archaeological features or artefacts were recorded in any of the trenches.

Jacinta Kiely, Eachtra Archaeological Projects, Ballycurreen Industrial Estate, Kinsale Road, Cork.

LIO13-228 Ballykeefe Fulacht fia

A spread of burnt stone and charcoal-rich soil was identified at the margin of the north side of the River Shannon floodplain and measured c. 7m by 7m and was 0.35m thick. The burnt stone was overlain by alluvium, suggesting that the site had been flooded. A rectangular trough (1.8m by 0.9m by 0.3m deep) was centrally located within the burnt-stone deposit and contained two poorly preserved worked timbers.

Graham Holl, TVAS (Ireland) Ltd, Ahish, Ballinruan, Crusheen, Co. Clare.

LIO13-241 Skehacreggaun Excavation – miscellaneous

A test excavation was undertaken to assess the archaeological potential of a greenfield site located at Mungret, Co. Limerick. The proposed development site is located close to but outside of the zone of archaeological potential of Mungret Abbey (LIO13-009).

Site 1

A total of 35 test trenches were excavated. Testing uncovered archaeologically significant remains in fourteen trenches, concentrated primarily across the eastern half of the development site.
These remains consisted primarily of agricultural activity such as ploughmarks and disused gullies and ditches. A total of four pits, two post-holes and a keyhole-shaped kiln were also identified. Further investigations will be carried out in 2008.

Site II
87 test trenches were excavated. The archaeological activity identified was concentrated along the north and north-eastern area of the proposed development site. The majority of the features identified were the remains of plough furrows and gullies associated with past agricultural activities. However, a total of thirteen pits, two kilns and five post-holes were identified and these suggest possible habitation or industrial use of the area. The recovery of iron slag and medieval pottery from several features may also be indicative of small-scale industrial activity generally associated with medieval ecclesiastical sites. Further investigations will be conducted in 2008.

John Kavanagh and Peadar Quine, Icon Archaeology Ltd, 12 Cherrymount Drive, Carlow, Co. Carlow.

LI013-242001 - Skehaacreggaun Souterrain
The site at Skehaacreggaun, Munrret, is 75m north-west of an ecclesiastical complex (LI013-009) and 125m east of a castle site (LI013-006). The site works were undertaken in June and July 2007 prior to a residential development on the site. The site comprises undulating pasture with limestone outcropping evident in the north of the site and bog evident in the south.

Fifteen parallel test-trenches were excavated at intervals of 8–11m. The trenches totalled 2413m. All fifteen trenches contained some archaeological material. Thirty-eight individual features were identified. These features comprise a souterrain, a possible kiln, 26 pits and ten linear features. These 36 features have been summarised into eight groups.

Group 1 contains two pits in the north-west of the site. The pits are adjacent to each other, suggesting a common function. Group 2 comprises a single linear feature aligned east-west and extending over six trenches in the centre of the site. The feature is probably a rectilinear boundary. Group 3 is two pits in the west of the site.

Group 4 is two pits and two linear features, extending over three trenches in the north of the site. An arc was extrapolated from one of the linear features which produced a diameter of 37m. This group may represent an enclosure located at the highest position on the site. Group 5 is similar to Group 4. A similar arc was extrapolated from a curvilinear feature that produced a diameter of 20m. This group of features was located to the east of Group 4 in the north-east of the site. Group 6 includes three pits and a linear feature in the east of the site.

Group 7 is a souterrain, a possible kiln, associated pits and a linear feature. These features were located in the centre of the site. The souterrain was identified by an intact 'drop-hole' with a chamber extending northwards. No further investigation of the souterrain was conducted. It is assumed that the pits, kiln and linear feature are associated with the souterrain activity.

Group 8 is similar to Groups 4 and 5. A circle was plotted based on three pit-type features. Should these small pits comprise post-holes (the remains of upright wooden posts) it is probable that a circular hut-type structure with an estimated diameter of 10m is represented.
Appendix 13-1

Resource and Waste Management Policy and Legislation Review
Appendix 13.1
Resource and Waste Management Policy and Legislation Review
Contents

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A1 Policy

European


Europe 2020 is the European Union’s ten-year growth strategy published in 2010. A key focus of the strategy is to support the shift towards a resource-efficient, low-carbon economy by decoupling economic growth from resource use and reducing the resource intensity of what we use and consume.

Roadmap to a Resource Efficient Europe, European Commission (2011)

The Roadmap to a Resource Efficient Europe outlines a “roadmap” to transform Europe’s economy into a sustainable one by 2050. It proposes ways to increase resource productivity and decouple economic growth from resource use and its environmental impact. The roadmap aims to address resource inefficiency in the sectors that are responsible for the greatest share of environmental impacts – namely food, buildings and mobility, whose combined effects account for 70-80% of all environmental impacts.

Measures are set out aimed at transforming production and consumption, with incentives for investors to promote green innovation, and a greater role for eco-design, eco-labelling, and greener spending by public bodies. Governments are invited to shift taxation away from labour towards pollution and resources, and to provide fresh incentives to push consumers towards resource-efficient products. The roadmap also recommends adapting prices to reflect the real costs of resource use, especially on environment and health.

7th Environmental Action Programme, European Commission (2014)

The 7th Environmental Action Programme came into force in January 2014 and will guide European environment policy until 2020. A key objective of the programme is to turn the Union into a resource-efficient, green and competitive low carbon economy. There is a special focus on turning waste into a resource, with more prevention, re-use and recycling, and phasing out wasteful and damaging practices like landfilling. By 2020 the European Union and member states are to ensure that:

- The environment and human health are protected by preventing or reducing the adverse impacts of the generation and management of waste.
- Per capita waste generation and waste generation in absolute terms are reducing.
- Landfilling is phased out for recyclables and recoverable wastes and limiting energy recovery to non-recyclable materials.


In December 2015 the European Commission adopted an ambitious Circular Economy Package, which includes revised legislative proposals on waste to stimulate Europe’s transition towards a circular economy.
The Circular Economy Package consists of an EU Action Plan for the Circular Economy that establishes a programme of action, with measures covering the whole cycle: from production and consumption to waste management and the market for secondary raw materials. The annex to the action plan sets out the timeline when the actions will be completed.

The proposed actions will contribute to “closing the loop” of product lifecycles through greater recycling and re-use, and bring benefits for both the environment and the economy.

The revised legislative proposals on waste set clear targets for reduction of waste and establish an ambitious and credible long-term path for waste management and recycling. Key elements of the revised waste proposal include:

- An EU target for recycling 65% of municipal waste by 2030;
- An EU target for recycling 75% of packaging waste by 2030;
- A target to reduce landfill to maximum of 10% of all waste by 2030;
- A ban on landfilling of separately collected waste;
- Promotion of economic instruments to discourage landfilling;
- Simplified, improved definitions and harmonised calculation methods for recycling rates throughout the EU;
- Concrete measures to promote re-use and stimulate industrial symbiosis - turning one industry’s by-product into another industry’s raw material;
- Economic incentives for producers to put greener products on the market and support recovery and recycling schemes (e.g. for packaging, batteries, electric and electronic equipment, vehicles).

Legislative proposals on waste adopted include a Proposed Directives on Waste, Packaging Waste, Landfill and Electrical and Electronic Waste, on End-of-Life Vehicles, and Batteries and Accumulators.

**National**

The first national waste policy statement was published by the Department of Environment and Local Government in 1998. A number of statements have been published since, each of which builds on the objectives of the previous plans to improve how waste is managed in Ireland, move waste away from landfill and towards a more sustainable option. The statements published to date include:


This policy document sets out measures through which Ireland will increase recycling rates and reduce delivery of waste to landfill following the entry into force of the Waste Framework Directive. Key measures set out in the report are as follows:

- Significant reduction of Planning Regions from ten to three. A review of regional waste management plans will be undertaken to comply with the requirements of the Waste Framework Directive.

- Timing and nature of the application of landfill bans will be considered taking into account the level of diversion being achieved and the development of viable beneficial uses for waste in support of the virtual elimination of our dependence on landfill.

- Ireland requires an adequate network of quality waste treatment facilities. The EPA will undertake a review of recovery infrastructure to advise on national requirements for managing municipal waste in accordance with the principles of proximity and self-sufficiency.

- All householders will be obliged to demonstrate that they are availing of an authorised waste collection service or are otherwise managing their waste in an environmentally acceptable manner.

- Through waste collection permits waste collectors will be required to manage waste in accordance with the waste hierarchy and operate pricing structures to incentivise environmentally sustainable behaviours by households in terms of waste reduction.

- Separate collection of organics will be a required waste permit condition for those collecting from households within population centres of a given size and will be introduced on a phased basis over a 4 year period, beginning with larger population centres.

- All current and future producer responsibility schemes will be required, as part of the conditions of their approval, to formulate, implement and demonstrate significant waste prevention and re-use initiatives for their particular waste streams.


The Third National Hazardous Waste Management Plan was published by the Environmental Protection Agency in 2014.

This Plan sets out priority actions to be taken over the six year life of the plan in relation to:

- Prevention of hazardous waste.
- Improved collection rates for certain categories of hazardous waste.
• Steps required to improve Ireland’s self-sufficiency in hazardous waste management.

• Identification and management of certain legacy hazardous wastes such as historic unregulated waste disposal sites and contaminated soil.

The plan includes eight key environmental objectives which will be adopted for the plan including, “To minimise the export of hazardous waste for treatment and/or disposal and reduce emissions due to transportation”.

The plan also includes a range of targets and indicators which provide a means of measuring progress towards the plan objectives. These include “minimise distance travelled by hazardous waste” and “Minimise export of hazardous waste and move towards self-sufficiency”.

Regional

Southern Region Waste Management Plan 2015-2021

For the purposes of waste management planning, Ireland is now divided into three regions: Southern, Eastern-Midlands, Connacht-Ulster. The Southern Region encompasses the local authorities: Limerick City and County Council, Tipperary County Council, Wexford County Council, Carlow County Council, Kilkenny County Council, Waterford City and County Council, Cork City Council, Cork County Council, Kerry County Council and Clare County Council.

The Southern Region Waste Management Plan 2015-2021 was launched in 2015. The plan emphasises the need to move from a linear to a circular economy to make better use of resources and for the region to become more resource efficient.

In relation to construction and demolition waste arisings for the region were reported as just below 1 million tonnes annually from 2010 to 2012. Nationally there has been a significant decline in C&D waste arisings from 18 million tonnes to 3 million tonnes from 2007 to 2011 following the economic downturn. As the construction sector in the region begins to recover the regional waste management strategies has identified the importance of ensuring that construction and demolition waste management plans are put in place and enforced. The plan notes that the region appears to have significant capacity for pre-treatment of C&D wastes.

While the key focus of the plan is household wastes it includes some sections and high level objectives in relation to non-process and process industrial wastes.

In relation to operational waste the plan predicts plan predicts growth in municipal waste generation in the region over the lifetime of the plan. (Municipal wastes include non-hazardous industrial wastes). The plan introduced a target recycling of 50% of managed municipal waste by 2020 and 0% municipal waste delivery to landfill without pre-treatment from 2016 onwards.

In relation to industrial wastes the plan notes from 2010 to 2012, non-hazardous industrial waste generation has remained constant. Hazardous industrial waste generation increased significantly in the same period with 72,000 tonnes.

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1 Industrial Waste not otherwise specified – Non-Hazardous
2 Industrial Waste not otherwise specified - Hazardous
generated in 2012. The plan notes this is mainly associated with increased activity in the pharmaceutical industry in the region.

Roles and responsibilities are outlined in the plan for business and industry, include implementing best waste management practices in the workplace with the emphasis on waste prevention and resource efficiency/segregation of waste produced into appropriate waste streams and implementation of appropriate Environmental Management Systems.

In relation to residual waste exports the plan notes the increasing trend towards export of residual wastes and states that: "The State is exporting a significant quantity of residual waste, which is poor use of a valuable resource from a self-sufficiency perspective." A key plan objective for local authorities and industry in the plan is to "Support the development of thermal recovery in the region which meets the needs of the region and the State in reducing the export of residual wastes for treatment abroad."

Local

Limerick County Development Plan 2010-2016

The Limerick County Development Plan includes waste management objectives as part of Chapter 8 Transport and Infrastructure of the Plan.

In terms of waste the main plan objective is to manage waste in a manner that minimises its generation, maximises recycling and recovery and protects the environment.

Section 8.5 of the plan sets plan policies and objectives in relation to waste management. Policies and objectives relevant to waste management and the proposed Irish Cement development are as follows:

| Objective IN O41: Regional Waste Management Plan | It is the objective of the Council to implement the provisions of the Waste Management Hierarchy and the Regional Waste Management Plan 2006-2011, and any subsequent review of this Waste Management Plan as it applies to this Council area. All prospective developments in the County will be expected to take account of the provisions of the Regional Waste Management Plan and adhere to those elements of it that relate to waste prevention and minimisation, waste recycling facilities, and the capacity for source-segregation. |
| Objective IN O42: Education and Awareness | To promote and encourage the education and awareness on all issues associated with waste management, at household, industry and community level. This will include the promotion of waste reduction by encouraging the minimisation, re-use, recycling and recovery of waste within the county. |
| Objective IN O43: Polluter pays principle | It is the objective of the Council to ensure the provision of quality cost effective waste infrastructure and services, which reflect and meet the needs of the community and to ensure that the 'polluter pays' principle is adhered to in all waste management activities. |
| Objective IN O45: Proposed waste disposal | It is the objective of the Council in assessing planning applications to have regard to the waste produced by proposed developments including the nature and amount produced and proposed method of disposal. Developments should ensure that production/disposal methods do not give rise to environmental pollution, result in undue loss of amenity or be detrimental to public health. |
| Objective IN O46: Construction and Demolition Waste | It is the objective of the Council to ensure that all significant construction/demolition projects include construction and demolition waste management plans. These plans should seek to focus on waste minimisation in general and optimise waste prevention, re-use and recycling opportunities and are required for developments of five or more housing units or commercial or industrial developments on sites in excess of 0.5 hectares. |
| Objective IN O47: Provision of transfer facilities | It is the objective of the Council to support the development of recycling sites/waste disposal sites or transfer stations and associated developments in appropriate locations, subject to normal planning and environmental sustainability considerations. In assessing applications for these types of development, the Planning Authority will have regard to the Groundwater Protection Plan and appropriate response matrix. |
A2 Legislation

European


Directive 2008/98/EC came into force on 12th December 2008 and Ireland has two years from this date to implement it into national law. The Directive lays down the five step hierarchy of waste management options with waste prevention as the preferred option, followed by re-use, recycling, recovery and safe disposal, in descending order.

In addition, the Directive also deals with the issue of 'end of waste' and clarifies the definition of recovery, disposal and the product. The Directive states that “The recovery of waste and the use of recovered materials as raw materials should be encouraged in order to conserve natural resources.”

National

**Waste Management Acts, 1996 to 2008 and Regulations Made under the Acts**

The Waste Management Act, 1996 was enacted in May 1996 and set out the responsibilities and functions of various persons in relation to waste. This was subsequently amended by a number of subsequent acts including the Waste Management (Amendment) Act 2001 and the Protection of the Environment Act 2003. The Act:

- Prohibits any person from holding, transporting, recovering or disposing of waste in a manner which causes or is likely to cause environmental pollution.
- Requires any person who carries on activities of an agricultural, commercial or industrial nature to take all such reasonable steps as are necessary to prevent or minimise the production of waste.
- Prohibits the transfer of waste to any person other than an authorised person (i.e. a holder of a waste collection permit or a local authority).
- Requires the Environmental Protection Agency (EPA) to make a national plan in relation to hazardous waste.
- Requires local authorities to make waste management plans in relation to non-hazardous waste.
- Imposes certain obligations on local authorities to ensure that a service is provided for collection of household waste and to provide facilities for the recovery and disposal of such waste.
- Enables the Minister for the Environment and Local Government to make Regulations for various purposes to promote better waste management.
- Provides for substantial penalties for offences including fines, imprisonment and/or liability for clean-up measures.

**Waste Management (Collection Permit) Regulations, 2007 as Amended**
Waste from the proposed development may only be collected by the holder of a waste collection permit or a local authority. Waste collection permits are granted in accordance with the Waste Management (Collection Permit) Regulations, 2007 as amended. Waste storage and collection areas on site should be designed to prevent environmental pollution.

**Waste Management (Shipments of Waste) Regulations 2007, S.I. No. 419**

Where waste from the proposed development is exported outside of Ireland for recovery or disposal the National Transfrontier Shipment (TFS) Office within Dublin City Council must be notified. Certain financial guarantees must be in place and a certificate issued by the National TFS Office prior to the waste movement taking place.

**SI 126 of 2011 - European Communities (Waste Directive) Regulations 2011.**

These regulations which were adopted in 2011 significantly changed the provisions of the Waste Management Acts, 1996 to 2011. The Regulations define "waste disposal" and "waste recovery" as well as setting out tests which must be complied with in order for material to be described as a "by-product" or achieve "end of waste" status.

The Regulations formally set out the following waste hierarchy which shall apply as a priority order in waste prevention and management legislation and policy:

(a) prevention;
(b) preparation for re-use;
(c) recycling;
(d) other recovery (including energy recovery); and
(e) disposal.

The Regulations require that all waste management plans and hazardous waste management plans in existence at the commencement of the Regulations shall be reviewed by 31 December 2012 and where appropriate be revised to be brought into line with Directive 2006/12/EC on Waste.

The Regulations also require the Environment Agency to establish a waste prevention programme by December 2013.

**Guidance**

**Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects**

These guidelines were published by the DoEHLG in July 2006. They were developed in conjunction with the National Construction & Demolition Waste Council (NCBWC) as part of the Voluntary Construction Industry Initiative and give advice on planning for C&D waste management. They also give guidance on source separation of waste, the diversion of waste from landfill and encourage construction companies to work towards achieving the national recycling target of 85% as outlined in the Government Policy Document Changing Our Ways (DOEHLG).
Appendix 13-2

Construction and Demolition Waste Statistics
Appendix 13.2

Construction and Demolition Waste Statistics
Contents

A1 Construction and Demolition Waste Statistics 1
A1 Construction and Demolition Waste Statistics

The most recent figures published by the Irish Environmental Protection Agency relating to construction and demolition (C&D) waste are for the year 2011, with some limited hazardous construction and demolition waste data published relating to the year 2012.

Approximately 3 million tonnes of C&D waste was collected in Ireland in 2011. Of this, just over 2.4 million tonnes was managed with approximately 2.4 million tonnes being recovered, a recovery rate of 79%. C&D waste is comprised largely of soil and stones. In 2011, almost 2 million tonnes of soil and stones was generated. Approximately 1.5 million tonnes of this was reported as being managed with almost 1.4 million tonnes reported as being recovered, equating to a recovery rate of 71%.

In addition, just over 1 million tonnes of ‘other’ C&D Waste was generated, and comprised metal, wood, glass etc. Just over 960,000 tonnes of this was managed with 934,841 tonnes reported as being recovered, equating to a recovery rate of 91%.

Ireland have met their target under the EU Waste Framework directive of 70% C&D waste preparation for reuse, recycling and other material recovery by 2020. Table 16.1 shows details of soil and stones managed in Ireland in 2011. A detailed breakdown of ‘other’ C&D Wastes managed in 2011 excluding soil and stones is presented in Table 16.2.

Table 16.1: Management of Soil and Stones Fraction of Construction and Demolition Waste in 2011

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Recovery (t)</th>
<th>Disposal (t)</th>
<th>Total (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPA Licensed Landfills</td>
<td>225,873</td>
<td>23,400</td>
<td>249,273</td>
</tr>
<tr>
<td>Local authority permitted sites</td>
<td>1,032,164</td>
<td>-</td>
<td>1,032,164</td>
</tr>
<tr>
<td>Treatment of Contaminated Soils</td>
<td>7,094</td>
<td>10,203</td>
<td>17,297</td>
</tr>
<tr>
<td>EPA Licensed Facilities</td>
<td>135,341</td>
<td>-</td>
<td>135,341</td>
</tr>
<tr>
<td>In storage at end of 2011</td>
<td>-</td>
<td>-</td>
<td>11,957</td>
</tr>
<tr>
<td>Estimate for non-submitted Waste Facility Permit AER's</td>
<td>-</td>
<td>-</td>
<td>92,870</td>
</tr>
<tr>
<td>Total Managed</td>
<td>1,400,472</td>
<td>33,603</td>
<td>1,538,902</td>
</tr>
</tbody>
</table>

Table 16.2: Management of ‘other’ C&D Waste (excluding Soil & Stones) in 2011

<table>
<thead>
<tr>
<th>Waste Stream</th>
<th>Recovery (t)</th>
<th>Disposal (t)</th>
<th>Total (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal</td>
<td>334,350</td>
<td>-</td>
<td>334,350</td>
</tr>
<tr>
<td>Wood</td>
<td>31,678</td>
<td>-</td>
<td>31,678</td>
</tr>
<tr>
<td>Glass</td>
<td>-</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Gypsum-based Waste</td>
<td>487</td>
<td>-</td>
<td>487</td>
</tr>
<tr>
<td>Rubble</td>
<td>158,835</td>
<td>17</td>
<td>158,852</td>
</tr>
<tr>
<td>Mixed or other C&amp;D Waste</td>
<td>409,491</td>
<td>25,158</td>
<td>434,649</td>
</tr>
<tr>
<td>In storage at end of 2011</td>
<td>-</td>
<td>-</td>
<td>45,968</td>
</tr>
<tr>
<td><strong>Total Managed</strong></td>
<td><strong>934,841</strong></td>
<td><strong>25,202</strong></td>
<td><strong>960,043</strong></td>
</tr>
</tbody>
</table>

From 2010 to 2011 there was a 13% decrease in the total quantity of construction waste collected in Ireland. C&D waste quantities have been decreasing annually from a peak of almost 18 million tonnes in 2007. This decrease is reflective of the significant downturn which occurred in the construction industry.

The construction sector generates hazardous waste such as lead-acid batteries, waste electrical and electronic equipment, healthcare risk waste, solvent-based paints and varnishes, pesticides, waste oils and asbestos.

The total amount of hazardous waste managed in 2012 is presented in Table 16.3. Of the total managed, 23% is treated on-site at industry, 30% is sent off-site to a commercial hazardous waste facility for treatment, and 47% is exported for treatment.

Table 16.3: Hazardous Waste Management in Ireland in 2012 (excluding contaminated soil)

<table>
<thead>
<tr>
<th>Category</th>
<th>Quantity (tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-site at Industry</td>
<td>68,100</td>
</tr>
<tr>
<td>Off-site in Ireland</td>
<td>88,866</td>
</tr>
<tr>
<td>Exported</td>
<td>139,872</td>
</tr>
</tbody>
</table>

In 2012, 7,884 tonnes of contaminated soil generated in Ireland was managed off-site. 54% or 4,246 tonnes of this was treated at Enva Ireland Limited’s Portlaoise facility which holds an EPA waste licence for acceptance of 40,000 tonnes per annum. The remaining 46% was exported to Germany and the Netherlands.
Appendix 13-3

Outline Construction Waste Management Plan
Appendix 13.3

Outline Construction and Demolition Waste Management Plan
Contents

C1 Outline Construction and Demolition Waste Management Plan 1
A1 Outline Construction and Demolition Waste Management Plan

In advance of the demolition, excavation and construction phases of the scheme a Construction Waste Management Plan which meets the requirements of the DoEHLG Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects (DoEHLG, 2006a) will be prepared by the contractor.

Where waste generation cannot be avoided this will maximise the quantity and quality of waste delivered for recycling and facilitate its movement up the waste hierarchy away from landfill disposal and reduce its environmental impact.

The outline Construction and Demolition Waste Management Plan for the proposed development is set out below:

The Waste Management Plan will include but will not be limited to:

- Details of main contractor including nominated project manager;
- The names, roles, responsibilities and authority of key personnel involved in waste management on site and in the design team;
- Estimates of waste generation including the types and quantity of wastes generated;
- Types and quantities of demolition and excavation material;
- Measures to reduce waste generation;
- The amounts of material intended to be stored temporarily on site and the location of such storage;
- Measures to prevent nuisances etc;
- Authorised waste hauliers with appropriate and up-to-date Waste Collection Permits;
- Recycling and disposal sites, including copies of permits/licences for waste facilities; and
- Any other relevant item during construction which may be brought to the attention of the design team or the contractor which should be reasonably addressed and inserted into the Waste Management Plan.

The following procedures should be included in the plan where relevant:

- Procedure for the control of sub contracts, if applicable, which must include the assessment of the sub-contractors waste management policies and control capabilities, and the identification and implementation of additional controls needed on such sub-contractors to fulfil the design teams and contractors obligations in respect of waste management;
- Procedure for dealing with waste management including liaison with third parties, statutory bodies, waste hauliers, waste disposal facilities and other companies;
• Procedure for the excavation and handling of waste materials to prevent nuisance;
• Procedure for the segregation and proper storage of materials onsite to facilitate reuse and recycling;
• Procedure for the management of any hazardous or contaminated waste;
• Procedure for the control of all documentation relating to the handling, transportation and disposal of waste; and
• Procedure for the management review/audits to monitor and demonstrate control over the implementation of the Waste Management Plan.

Possibilities for re-use of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use. Where excavation material cannot be re-used within the proposed works it can be transferred to the overburden mound on site. In addition to the above during the construction phase the following mitigation measures are recommended:

• Source Segregation: Where possible metal, timber, glass and other recyclable material will be segregated during construction and removed off site to a permitted/licensed facility for recycling. Waste stream colour coding and photographs will be used to facilitate segregation;
• Material Management: ‘Just-in-time’ delivery will be used so far as is reasonably practicable to minimise material wastage; and
• Waste Auditing: The Contractor will record the quantity in tonnes and types of waste and materials leaving site during the construction phase. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material which is recovered and disposed of.