Appendix 1

THE PROPOSAL

(NOTE: The details provided here may differ from those described in the ES which pre-date the receipt of the amended plans).

The Findhorn/Pilmuir FAS will alleviate flooding in Forres from the River Findhorn and the local catchment of Pilmuir. The scheme is designed to provide a 1 in 200 year standard of defence against flooding from the River Findhorn. It will convey flood flows safely past Forres by a combination of works to the River Findhorn channel and adjacent floodplain (including flood embankments, road raising and gravel extraction) and a drainage channel to divert overland flows from Pilmuir to the River Findhorn. The 10 key works in the Findhorn/Pilmuir FAS are:

Pilmuir Drainage Channel and Pumping Station

The Pilmuir drainage channel and pumping station will divert and channel floodwater away from Pilmuir into the River Findhorn. These works are located to the east/south-east of the West Forres Embankment within the area of Pilmuir within Forres. (When the open channel crosses under the West Forres Embankment it is then referred to as the West Forres drainage Channel and Outfall).

The pumping station area, enclosed by 1.8 m high steel palisade fencing, is located on the eastern side of the West Forres Embankment. Part of this L-shaped building houses a motor control centre (approx. 14 x 5.4 x 3.3 (eaves)/5.7(ridgeline) m) which is externally finished with cream coloured roughcast walls and brown tiles over a piended roof. The remainder of the building houses three pumps (approx. 10.5 x 4.7 x 3.5/4 m) with the same roughcast wall finish and a shallow mono-pitched grey metal roof with 3 domed skylights to facilitate removal of the pumps. A turning area near the building will be constructed for use by maintenance vehicles.

Upstream of the pumping station building but approx. 2.5 m below ground level, the drainage channel becomes a series of 4 culverts, each approx. 0.9 m wide. These culverts run under the West Forres Embankment and discharge into the West Forres Drainage Channel. At the upstream end of the culverts, water can overspill into a below ground pumping chamber, approx. 10.7 x 11.8 x 5 (depth) m, from which water is pumped to the River Findhorn through rising pump mains piped (also laid under the West Forres Embankment). The chambers/culverts are protected by in-channel trash screens and covered over by open mesh flooring and working platforms.

Extending upstream from the Pumping Station to Pilmuir Road West, there will be a single open drainage channel, approx. 360m long which reduces in width and depth (upstream) from 19.2 to 11.5 m and from 2.1 to 0.93 m respectively. The width of the channel bed is staged, at 1 and 5 m and the side slopes are lined with shingle cobble scour protection (which will 'green up' over time). On both sides of the channel there will be a 3 m wide access track raised approx. 0.2 m above ground level and formed from crushed road planings or crushed rolled gravel, and separated from the channel by a 1 m wide (nominal) grass verge. 1.2 m high post and wire fencing will bound the Channel/track. Along this part of the channel, two bridge crossings are proposed, for maintenance/access purposes (no details of bridge structures provided).

At Pilmuir Road West, the channel is culverted for 60 m under the road and part of Pilmuir Playing Fields, with two circular culverts approx. 0.6 m diameter and located approx. 1.2 m below existing ground level, and two rectangular culverts, approx. 1.2 m wide. The (upstream) inlet arrangements include a trash screen, aluminium stop logs and a silt trap with open mesh flooring and working platform over. The (downstream) outlets to the culverts are protected by steel security gates. The wing walls and side slopes to both the inlet and outlet structures have a fair-faced concrete finish. The culvert arrangements require the existing football pitch area and guard rail to be moved approx. 7 m to the north-east.

Upstream of this culvert, the drainage channel 'splits' into two channels. The 'main' Pilmuir drainage channel runs east across the nursery field and into the ground beyond. This open channel is approx. 260 m long, reducing in width and depth upstream from approx. 7.6 to 4.3 m and 0.89 to 0.09 m respectively. Access tracks are proposed along both sides of this channel. At its eastern end (on north side) the track will be 0.81 m above existing ground level. The side slopes and channel bed (1 m wide) will be lined with shingle/cobble scour protection.

The 'southern' Pilmuir Drainage channel runs south/south-east, generally following the edge of nursery field. This open channel is approx. 450 m long, reducing in width and depth (upstream) from 8.2 to 4 m and from 0.77 to 0.31 m respectively. The 45 m 'tail' of the channel is 5.7 m wide and 0.66 m deep and is a ditch filled with filter drain material, to collect surface and ground water, and is graded to lead water away from this area. The side slopes and channel bed (1 m wide) will be lined with shingle/cobble scour protection. A 3 m wide access track will be formed only along the eastern side of the channel, returning along the southern side of the 'tail' before taking access to/from Balnageith Road.

The construction programme duration for this work is approx. 57 weeks.

West Forres Embankment

The flood defence is a 700 m long embankment extending south/south-west from the proposed raised section of the A96 road to a point on the floodplain east of Red Craig. To the west, the embankment is located between the Greshop Farm Scheduled Ancient Monument (SAM) site and the West Forres Drainage channel, and to the east is the Pilmuir area of Forres. The embankment is located on part of an area designated for environmental improvement. Between the A96 road and Pilmuir Pumping Station, the embankment is approx. 49.1 m wide (at northern end) reducing to 46.4 m wide (near pumping station), with a 33.3 m wide crest. (Under the embankment 3 pumping mains will be laid between Pilmuir Pumping station and the River Findhorn). Thereafter, the embankment extends south-west over agricultural land, reducing in height to tie into the existing ground and reducing in overall and crest width from 31.4 m to 10 m and 22.6 to 6 m respectively. The embankment will be enclosed by 1.2 m high post and wire fencing, and where existing access is disrupted to the adjoining fields, access along, beside or over the embankment will be provided.

The earth fill embankment will reduce in height from approx. 2.5 m (max) at north end, to connect with the raising of A96 road and its 'tail' will tie into the existing ground level at it southernmost end. The embankment will be formed from gravel material excavated from the point bars adjacent to the River Findhorn (Bends 1 & 3), which after being processed/crushed will be compacted, top soiled and grass seeded over. A toe drain, to control groundwater seepage under the embankment during a flood event, will be installed along the eastern edge of the embankment.

Access for operational and maintenance works for the embankment and pumping station will be provided from the new A96 roundabout, along or beside the embankment.

The construction programme duration for this work is approx. 71 weeks.

West Forres Drainage & River Outfall

West from the Pilmuir Pumping Station, water will discharged to the River Findhorn through an outfall headwall either through pumping mains or a drainage channel arrangement.

Approx. 360 m of pumping mains pipe work will be laid under the West Forres Embankment and the A96 road. At the discharge, the outfall is fitted with flap valves to preclude back flows under flood conditions.

The West Forres Drainage Channel links the new Pilmuir Drainage Channel to the outfall into the River Findhorn and will drain the floodplain after an out of bank river flow (in excess of 1 in 25 year flow). This open drainage channel will be excavated along the western edge of the West Forres Embankment, between the embankment and the SAM site. Water from the Pilmuir Drainage Channel is discharged into the channel through a series of culverts under the West Forres Embankment which are fitted with flap valves to preclude inundation of water to Pilmuir from the River Findhorn.

The open channel is approx. 160 m long, 20 – 22 m wide and 2.3 m (max), deep with a staged channel bed width of 1m/5 m and side slopes are lined with shingle/cobble scour protection. At its northern end (but south of the A96), the channel is the culverted (4 culverts) for approx. 100 m under the raising of the A96 (T) road and part of the West Forres Embankment with grout curtain which is located over the south western corner of the Mackenzie & Cruickshank Garden Centre. The walls and wing walls of the inlet structure will be finished with fair faced concrete and include a 2.3m high trash screen to collect floating debris and prevent unauthorised access to the culverts and a 5.15 x 3.8 x 2.8 m galvanised flood cage frame.

Water from the culverts and pumping mains will discharge into a channel off the main River Findhorn channel through an L-shaped outfall headwall structure finished with fair faced concrete. The outlet headwall is approx. 24 m long and 2.3 m high. The downstream end of the culverts/pipes will be fitted with flap valves to preclude back flows into the culverts. A turning area near the headwall will be constructed for use by maintenance vehicles.

Between the outfall headwall and the bed of the river channel, rock armour will be provided to preclude scouring.

The construction programme duration for this work is approx. 40 weeks.

Raising of A96 road

The A96 road will be raised on an earth full embankment using gravel material excavated from the point bars adjacent to the River Findhorn (Bends 1 & 3), which after being processed/crushed will be compacted, top soiled and grass seeded over. Existing utilities will be permanently or temporarily diverted and re-installed in the adjoining road verge and a new carriageway surface provided.

The road embankment is approx. 650 m long and follows the existing horizontal alignment of the A96 road. The proposed carriageway will be raised above the existing carriageway by up to 3.4 m (max.) and tie in with the crest levels of the West Forres Embankment/West Forres Embankment with grout curtain on either side of the road.

Over the existing A96/Greshop Industrial Estate junction a new 4-arm roundabout will be provided, and unlike the current arrangement (access only), the northern arm will enable both access and egress to/from Greshop Industrial Estate. The southern arm will be used to access the scheme, for operation and maintenance purposes, in particular the West Forres Embankment and Pilmuir Drainage Channel. The new roundabout will be approx. 45 m in diameter (to edge of carriageway) with a 31.5 m diameter centre (to be planted). New sections of 3 m cycleway/footway and/or 2 m footways will be provided and connect to existing cycle- and footways.

Whilst raising the A96 road, the A96 will be temporarily diverted to the south of the existing road alignment. A temporary road approx. 700 m long and 11 m wide carriageway, with a 1.9 m wide footway will be provided and raised 0.5 m above existing ground level. On completion of the raised road embankment, the temporary road will be removed and the ground reinstated although part of the diversion route will be covered over by the West Forres Embankment.

The construction programme duration for this work is approx. 66 weeks.

West Forres Embankment with Grout Curtain

The embankment will be located on the right hand bank between the River Findhorn and the western boundary of Greshop Industrial Estate/Mackenzie and Cruickshank Garden Centre. The downstream end of the embankment will be aligned through the northern end of the Garden Centre to tie into the railway embankment. The upstream end of the embankment will return to connect into the embankment formed to raise the A96 road, to provide continuity in the standard of defence.

The eastern face of the embankment along the Garden Centre boundary incorporates a crib/retaining wall, up to 2.4 m high at its southern end, to minimise land take. Within the embankment an approx. 1m wide ‘grout curtain’ will be constructed by pressure injection grout directly into the soil at close spaced intervals to approx. 10 - 15 m depth (to bedrock), to form an impermeable barrier and control seepage of groundwater under the embankment.

The existing earth embankment along this bank/boundary will be incorporated into the new embankment, which will be approx. 0.5 m higher and extended to the north, south and west. This new embankment will be approx. 210 x 20 x 1.7, with a 4 m wide crest incorporating a 1.4 m wide crushed rolled gravel path. The embankment will be formed from gravel material excavated from the point bars adjacent to the River Findhorn (Bends 1 & 3), which after being processed/crushed will be compacted, top soiled and grass seeded over. All (mature) trees along the boundary between the garden centre and the river will be removed but replanting is proposed.

Vehicular access for maintenance will be provided along the crest of the embankment from the southern end and towards the northern end instead of steps as originally proposed, access ramps will be provided over the embankment to maintain existing public access arrangements to the riverbank.

The construction programme duration for this work is approx. 52 weeks.

West Forres Revetment

Enhancement works will be undertaken to the toe of the existing rock revetment at Findhorn Viaduct (which supports the Aberdeen to Inverness railway) to provide scour protection to the riverbank and to protect/avoid failure of the eastern abutment of this railway bridge from scour.

Over an area of approx. 300 sq. m between the river and the Pillbox, adjacent to the railway line embankment, rock scour protection will be provided with 3 – 6 tonne (1 – 1.5 m size) armour stone rocks laid along the toe of the existing river bank, where the channel is at its deepest on the outside of a bend in the river. Existing trees will be removed.

The construction programme duration for this work is approx. 8 weeks.

River Bank (Left Bank) Vegetation Removal & Gravel Extraction (Bends 1 and 3) and haulage tracks

Bend 3

Once works at Back Run are near completion (see below), excavation works at Bend 3 can be undertaken to remove existing vegetation from the river gravel point bar opposite Waterford Farm and the Waste Transfer Station. The gravel point bar platform crest level will then be lowered by excavating sands/ gravels/cobbles by up to 2 m depth over an area of 30,500 sq. m. An existing track within the area will be removed during the channel excavation works.

Initially, to extract material from the river bank and thereafter, for operational and maintenance purposes, a vehicle haulage route to Bend 3 will be provided, with a new access to/from the C7E Brodie – Dyke - Kintessack road. This route will be constructed along the northern side of the railway line, along the edge of fields to Findhorn Viaduct and thereafter along the landward edge of fields along an existing Broom of Moy flood embankment before joining an existing track leading to Bend 3 and the Back Run. This haulage route with passing places, to be formed from recycled road planings or crushed rolled gravel, is approx. 1900 m long and 6 m wide (9m at passing places) and laid at or just above existing ground level and bounded by 1.2m post and wire fencing and gates. Along this route two temporary site compounds/processing centres will be provided where excavated material will be processed/crushed and stored prior to re-use where possible on the embankments within the scheme.

Bend 1

Once excavation works on Bend 2 (opposite Broom of May) are nearing completion (see below), excavation works at Bend 1 can be undertaken, removing existing vegetation from the river gravel ‘point bar platform’ upstream, under and downstream of Findhorn Viaduct. The gravel point bar platform crest level will then be lowered by excavating the sands/ gravels/cobbles in the vicinity of the railway bridge by up to 2 m depth over an area of 43,000 sq. m.

West of Bend 1, existing trees, scrub and under-storey vegetation will be removed from within an area, approx. 600 m x 120 m (max.). At its western end, downstream of Findhorn road bridge, existing gravel deposits will be re-worked but not removed, to open up an old channel (no other details provided)

Initially, to extract material from the river bank and thereafter, for operational and maintenance purposes, a vehicle haulage route to Bend 1 will be provided, with a new access to/from the C7E Brodie – Dyke - Kintessack road. This route will be constructed along the crest of an embankment, approx. 5 m above existing ground level but formed along the southern side of the railway line and along the edge of fields towards Findhorn Viaduct and Bend 1. This haulage route with passing places, to be formed from recycled road planings or crushed rolled gravel, is approx. 1000 m long and 6 m wide (9m at passing places) and bounded by 1.2m post and wire fencing and gates. The embankment will be formed from crushed compacted excavated fill material, top-soiled and grass seeded over. Along this route a temporary site compound/processing centre will be provided where excavated material will be processed/crushed and stored prior to re-use where possible on the embankments within the scheme.

At the western end of the haulage route, near the new access junction with the C7E road, the existing landform will be re-profiled and lowered by up to 5 m over an area approx. 240 m x 80 m (max.) as part of a proposed borrow pit.

Removal of material from Bends 1 and 3 (and 2 and Back Run) is to allow the river to convey flood flows up to the 1 in 200 year event design, restoring the river to its natural regime and address issues of sediment accretion that have arisen over the years and have reduced the capacity of the river corridor to convey flood flows.

The construction programme duration for this work is approx. 20 weeks.

River (Right) Bank Vegetation Removal & Gravel Excavation (Bend 2) & Haulage Track and new bridge south of Broom of Moy

Once works on Bend 3 are nearing completion (see above), excavation works at Bend 2 can be undertaken, removing existing vegetation from the river gravel point bar platform opposite the Broom of Moy. The gravel point bar platform crest level will be lowered by excavating sands/ gravels/ cobbles by up to 3 m (max.) depth over an area of 40, 500 sq. m. Existing tracks within this area will be removed during the channel excavation works.

To maintain the connections to the existing SUSTRANS route and other pedestrian routes between Broom of Moy and the east to the east of Bend 2, the existing footbridge (a Bailey Bridge) at Broom of Moy will be extended over the gravel extraction area by a new 3- span prefabricated steel truss bridge, supported on two intermediate concrete piers. The new bridge, approx. 95 x 2.5 x 3 m (max.) will abut the southern abutment of the existing bridge and have a higher soffit level (by 0.75 m) than the existing bridge, to allow flood flows to pass underneath without affecting bridge stability. The new bridge design will complement rather than match the existing bridge design but it will be painted in the same colour.

At the southern end of the new bridge, three 2.5 m wide access ramps, to south-west, south-east and north-east will be provided to tie in with the existing footpaths and/or the SUSTRANS route. The latter, finished with rolled crushed gravel tracks, then leads north east to joins part of a haul track leading to/from Bend 2.

Vehicular access for excavation and thereafter for operating and maintaining Bend 2, will be provided along the crest of the new North Forres Embankment between Waterford Road and Greshop House and thereafter, a new section of track, approx. 200 m long and 6 m wide will be formed at existing ground level through the woodland and ramped down into Bend 2. The alignment of this part of the track will be determined to minimise tree removal and only trees along the route will be felled.

The construction programme duration for this work is approx. 26 weeks.

North Forres Embankment & Road Raising of Waterford Road

An earth fill embankment will be formed from gravel material excavated from the point bars adjacent to the River Findhorn (Bend 2), which after being processed/crushed will be compacted, top soiled and grass seeded over. This embankment will be constructed on the River Findhorn's floodplain north of Forres, from Findhorn Viaduct in the west to a point on the floodplain approx. 340 m east of Waterford Farm within an area of slightly higher ground in the middle of a field;

The embankment is 1270 m long, initially runs parallel to and is built off the railway embankment (approx. 2.2.m high and 22.5 m wide with a 14.75 m wide crest) before heading north-east towards the north-western corner of Greshop House. Along this section the embankment width and crest varies between approx. 32 m and 18 m, and 14 m and 11 m respectively, and its height reduces to 1.6 m at Greshop House.

Thereafter, the embankment returns along the northern boundary of Greshop House, and then heads north-east across fields towards Waterford Road and beyond. Here, the embankment width varies between 18 m and 13.5 m and increasing to 24 m at Waterford Road, to accommodate an access junction for an access haulage track to/from Bend 2 which laid along the 8.35 m wide crest of the embankment. The embankment height reduces to approx. 0.8 m, or 0.95 m at Waterford Road. Beyond Waterford Road, the embankment is approx. 13 m wide with an 8.35 m crest (without access track) and its height reduces to 0.63 m within the field at its north-eastern end. Along both sides of this part of the embankment are temporary site compounds/processing centres where excavated material will be processed/crushed and stored prior to re-use where possible on the embankments within the scheme.

Waterford Road is also raised over this embankment, along the same alignment as the existing road and again using fill material excavated and processed from elsewhere within the scheme. The road is raised over approx. 320 m to a height of 0.95 m (max) to tie into the same crest level as the adjoining embankment. Waterford Road will be closed whilst the road is raised, with no diversion shown in the amended plans.

Access for operational and maintenance works for this embankment and Bend 2 will be taken from Waterford Road. Where existing access is disrupted to the adjoining fields, access along, beside or over the embankment will be provided.

An informal public access path between Forres and Broom of Moy, which currently runs to the east and north of Greshop House before running through the woodland, will be re-routed over the embankment crest south of Greshop House.

The construction programme duration for this work is approx. 36 weeks.

Gravel Excavation & Vegetation Clearance of the Back Run

The Back Run is an occasional river channel for the River Findhorn, north of the Mains of Moy. The gravel bar platform crest level, at the entrance to the Back Run will be re-profiled and a channel approx. 420 m long, 20 m wide and up to 0.85m deep will be excavated leading towards the central and lower vegetated reaches of the channel. Thereafter, a clear continuous channel, from the River Findhorn to the Muckle Burn, will be re-formed along the Back Run by cutting the existing trees/shrubs down to ground level. The surface vegetation will not be removed.

Vehicular access for operation and maintenance will be provided from the C7E road, via the new haulage tracks constructed to/from Bend 3 and an existing track leading from the northern end of Bend 3 to Back Run.

As with works proposed on Bends 1, 2 and 3, this work will enable the river to convey flows up to the 1 in 200 year event, to restore part of the natural regime of the river, which has been altered over the years.

The construction programme duration for this work is approx. 12 weeks.

Landscaping Details

A landscape planting scheme has been developed as an integral part of the Findhorn/Pilmuir FAS, to help replace planting being removed and to mitigate against potential adverse landscape and visual effects arising from the scheme.

A survey records details about the locations and species, etc of trees where vegetation is being removed to enable the Findhorn/Pilmuir FAS to be constructed, operated and maintained. The exact number of trees to be removed/felled is not specified but 5265 trees, mainly whips and 111 shrubs will be planted to replace some but not all of the trees being removed.

Indigenous tree and shrub species are proposed to foster new habitats and link existing areas of native woodland. In some areas indigenous species will replace non-indigenous species (e.g. to west of Garden Centre) or dense shrub mainly gorse is replaced by broadleaf planting (e.g. on left bank north of Findhorn Viaduct) to offer greater aesthetic value and assist with bio-diversity.

Two tree/shrub mixes are proposed. ***Type 1 (riparian)*** will be used along the banks of the River Findhorn, including alder, birch, rowan and willow species found elsewhere along the River Findhorn, which are capable of colonising and establishing along river banks and protecting soil from erosion. ***Type 2 (amenity)*** will be used on the A96 road embankment, a mix of broadleaf and coniferous species including pine, birch and oak, to reduce visual impact and soften views towards Pilmuir and Greshop Industrial Estate.

Grass seeding will be used on all embankments to mitigate impact and appearance and stabilise ground from erosion. Four different types of seed mix are proposed, for example, *Type 1 (clover and grass)* on North and West Forres embankments, *Type 2 (hard wearing grass)* on turning areas adjacent to the pumping station, *Type 3 (stabilising grass mix)* within the Pilmuir drainage channel and *Type 4 (woodland meadow)* on the embankment between the garden centre and the River Findhorn.

Site Compounds

A total of 11 no. contractor site compounds (of varying size) are proposed at various locations e.g. off Pilmuir Road West between West Forres Embankment and the residential area at Pilmuir adjacent to the A96, or along haul tracks to Bends 1 and 3, and 2, the latter in fields at Waterford Farm and north of Greshop House. The compounds will include temporary site offices and welfare accommodation plus fabrication and material/vehicle storage.

A total of 6 no. processing areas are also identified i.e. two off Waterford Road to the north and east of Greshop House (to process excavated material from Bend 2), one for the West Forres Embankment and Pilmuir Drainage Channel between these two scheme works, and one to the south (for Bend 1) and two to the north (for Bend 3) of the railway line. These areas will be used to process excavated material including sand/gravel/cobbles, approx. 220,000 cubic metres excavated from lowering gravel banks at Bends 1, 2 and 3, of which 160,000 cubic metres will be re-used for construction of embankments after being sorted, screened and crushed. Surplus material will be stored on site for future use or transported away from the site.

South of Newton of Dalvey, a potential gravel storage area is identified but it is understood this area is no longer required as part of this scheme (no further details provided).