

**Site Forms**

YOUR DETAILS	
<b>Your Name</b> (and organisation if applicable)	<b>Speyrocl Ltd</b>
<b>Your Address / Contact Details</b>	120 Strathmore Road
	Balmore Industrial Estate
	Glasgow
	G22 7DW
<b>Landowner's Name</b> (if known / applicable)	Sir James Horlick
<b>Agent</b> (if applicable)	Bracewell Stirling Consulting
<b>Agent's Address / Contact Details</b> (if applicable)	5 Ness Bank
	Inverness
	IV2 4SF

DETAILS OF SITE SUGGESTED	
<b>Site Address</b>	Land Adjacent to Hall, Inchmore
<b>Site/Local Name</b> (if different from above)	
<b>Site Size</b> (hectares)	4 Ha
<b>Grid Reference</b> (if known)	256900N 844900E
<b>Proposed Use</b> (e.g. housing, affordable housing, employment, retail, waste, gypsy traveller, utility, community, retained public open space)	Housing and associated amenity uses
<b>Proposed Non Housing Floorspace / Number of Housing Units</b> (if known/applicable)	40 approx housing units of various sizes and tenures. New allocation for 30 units. Originally zoned site with existing permission for 7 units to be increased to 10 units.
<b>Map</b>	Map attached

<b>If you wish to suggest a site that should <u>not</u> be built on, fill in this form</b>	
REASONS WHY YOUR SITE SHOULD BE SAFEGUARDED FROM BUILDING	
<b>How do the public enjoy the space</b> - e.g. used for dog walking, children's play?	
<b>What makes the site more special</b> than other areas in the village/town?	
<b>Does the site have attractive or rare features</b> such as mature trees, historical significance or protected wildlife?	

*Landowners, developers and/or agents wishing to suggest a site should fill in the following form and as much as possible of the strategic environmental assessment form (at the end of this document) which assesses the environmental effects of possible development sites.*

<b>If you wish to suggest a site that should be built on, fill in this form</b>	
REASONS FOR YOUR DEVELOPMENT SITE SUGGESTION	
<b>How can the site be serviced?</b> (give details of proposed access, foul drainage, surface water and water supply arrangements)	All relevant service infrastructure is available for connection subject to capacities being confirmed.
FORM CONTINUES BELOW	

REASONS FOR YOUR DEVELOPMENT SITE SUGGESTION

<p><b>What are the site's constraints and how can they be resolved or reduced?</b> (e.g. does the site flood, are there protected species present, will good farmland be lost, will the local landscape be affected, will valued trees be felled, are any other heritage features likely to be affected?)</p>	<p>The site is reasonable quality grazing land allocated for amenity but it has no meaningful use or utility. Trees bordering the site will be retained and protected, and enhanced with new planting.</p>
<p><b>What benefits will result to the wider community from the site's development?</b> (e.g. will there be more or better jobs, will the land be put to a more productive use, will the development increase infrastructure capacity for others, will more affordable houses result, is there an unmet demand for the development?)</p>	<p>Easily accessible land which can provide a range of mixed tenure housing and potential for public amenity. Site well located for existing schools and village services and amenities. Is adjacent to existing good pedestrian/cycle linkages and playing fields/ open space.</p>
<p><b>What impact will there be on travel patterns from the site's development?</b> (e.g. will more or less people engage in active and healthy travel (walk / cycle) or go by public transport as a result of the site's development rather than travel by private car?)</p>	<p>The site has good accessibility by public transport off a main bus route as well as convenient opportunities for pedestrian and cycle linkages to other nearby villages. New bus stop as part of original Planning consent.</p>
<p><b>Is the site well connected?</b> (e.g. will the average travel time to community and commercial facilities reduce or increase as a result of the site's development, is the proposed use compatible with existing / proposed surrounding uses?)</p>	<p>The site is an efficient development location with many linkages able to be connected to, which will complement the existing fabric of the village.</p>
<p><b>Is the site energy efficient?</b> (e.g. will the site allow for energy efficient siting, layout, building design and local renewable energy source connection?)</p>	<p>The site has a northerly aspect but designs can take full advantage of available solar gain and outlook.</p>
<p><b>What other negative impacts will the development have and how will they be resolved or offset?</b> (e.g. will the site's development increase any form of pollution or decrease public safety?)</p>	<p>The site will result in the loss of open undeveloped land which designated amenity in the current local plan. It is grazing land at present with no effective use for public amenity.</p>

Landowners, developers and/or agents wishing to suggest a site should fill in as much as possible of the following form. Strategic environmental assessment of local development plan sites is now a statutory requirement and considers the possible environmental effects of development proposals. We will check your answers and fill in any gaps.

No.	Issue	Detailed Explanation	Answer	Any Proposed Mitigation Measures (how will you reduce or offset the effects of your development?)
1	a) Will the site safeguard any existing open space within the area?  b) Will the site enable high quality open space to be provided within the area?	Will the site have any impact on useable public open space (such as parks, playing fields etc) or any opportunities to create additional public open space?	An undeveloped area will be lost and replaced by housing, while still retaining a good balance of amenity space.  Yes	New good quality play space and open space can be provided.  Yes – a new village green can be provided adjacent to hall to enable complementary uses between the two facilities.
2	Will the site encourage and enable provision for active travel (walking, cycling and public transport use)?	Is any part of the site within 400m straight line distance of any community/commercial building? or will development provide a community/commercial building within walking distance of existing residential areas? - Are there opportunities to create new walking/cycling routes or improve existing routes?	YES – The site integrates with the existing village centre and provides a useful village park facility. Yes – Public House and Community Hall within 400m.	This is adjacent to existing walking/cycling routes linking to neighbouring villages.
3	Does the site provide an opportunity for you to provide a financial contribution towards encouraging more sustainable travel patterns?	For example, can a subsidy to a local bus route be provided?	Possible- subject to negotiated consideration.	Relative priorities will be assessed in consultation with Highland Council and relevant community organisations
4	Will the site involve “off site” road improvements that will contribute to road safety?	Is the site likely to improve the local road network such as junctions or crossings?	Off-site improvements are possible in discussion with TEC Services.	Possibility of improvements to A862.
5	Is there scope for road safety measures as part of the development of	Will development incorporate on-site traffic calming measures (e.g. speed bumps) or street lighting? Will it incorporate the	Yes but appropriate incorporation of these will be investigated with TEC Services.	Yes – if considered appropriate and levels are achievable.

	the site?	principles of Designing Streets available via: <a href="http://www.scotland.gov.uk/Publications/2010/03/22120652/0">http://www.scotland.gov.uk/Publications/2010/03/22120652/0</a>		
6	Is the site near any existing “bad neighbour” uses?	Will the site be negatively affected by any neighbouring use? (bad neighbour uses include those that affect residential property by way of fumes, vibration, noise, artificial lighting etc). Is the site affected by any of the Physical Constraints identified in the Council’s Physical Constraints: Supplementary Guidance?	No	
7	Are there any contaminated land issues affecting the site?	Are you aware if the site has been previously used for industrial or any other uses likely to cause contamination?	No	
8	a) Is the site on derelict, vacant or other land that has previously been used?  b) Is the site on greenfield land?	a) Has the site been identified in Scottish Government’s Vacant and Derelict Land Survey (which can be found here: <a href="http://scotland.gov.uk/Publications/2010/01/26135819/0">http://scotland.gov.uk/Publications/2010/01/26135819/0</a> )or has the land got an existing use?  b) Will the site be located on presently undeveloped land e.g. presently or capably used for agriculture, forestry or amenity purposes?	No  Yes	
9	Is the site within the current settlement boundary?	Is the site within any identified settlement boundary in the Local Plan? Is it allocated for any uses?	No	
10	Will the site affect the distinctiveness and special qualities of the present landscape character or affect any landscape designation?	Does the site conform with the Landscape Capacity Assessment (if available)? Will the site result in the removal of valued landscape features or negatively affect any key views? Is it located within or would otherwise affect a National Scenic Area or Special Landscape Area, having regard to their special qualities?	Designated as amenity in current local plan, but it has no effective use for public amenity.	The site has a prominent copse of trees to the south which will be retained and enhanced.
11	Will the site affect any areas with qualities of	Are you aware if the site is inside or likely to affect an area of Wild Land? (These areas are	No	

	wildness? (that is land in its original natural state?)	identified on Map 3 of SNH's Policy Statement, Wildness in Scotland's Countryside) and areas of Remote Coast identified by the Council, or an area of wildness identified in the draft Wild Land Supplementary Guidance?		
12	Will the site affect a conservation area?	Is the site inside or likely to affect the character of a confirmed Conservation Area?	No	
13	Will the site impact on any listed building and/or its setting?	Is there a listed building or a part of the setting "area" of a listed building within the site?	No	
14	Will the site affect a site identified in the Inventory of Gardens and Designed Landscapes?	Is any part of the site inside the outer boundary of an Inventory "entry" or will the site affect the setting of an "entry"?	No	
15	Will the site affect any locally important archaeological sites identified in the Historic Environment Record?	Does the site contain any features identified in the HER? If yes, will the site affect the feature?	None known	Professional archaeological field assessment may be required.
16	Will the site impact on any Scheduled (Ancient) Monument and/or its setting?	Is there any SAM within the site boundary or will a SAM be affected?	No	
17	a) Will the site affect any natural heritage designation or area identified for its importance to nature conservation?  b) Will the site affect any other important habitat for the natural heritage?	a) Is any part of the site inside or likely to affect the designation (SAC, SPA, SSSI, NNR, Ramsar) or Local Nature Conservation Site?  b) Is any part of the site within or likely to affect non-statutory features identified as being of nature conservation importance e.g. Ancient, Semi-Natural or Long-Established Woodland Inventory sites, priority BAP	No  No	

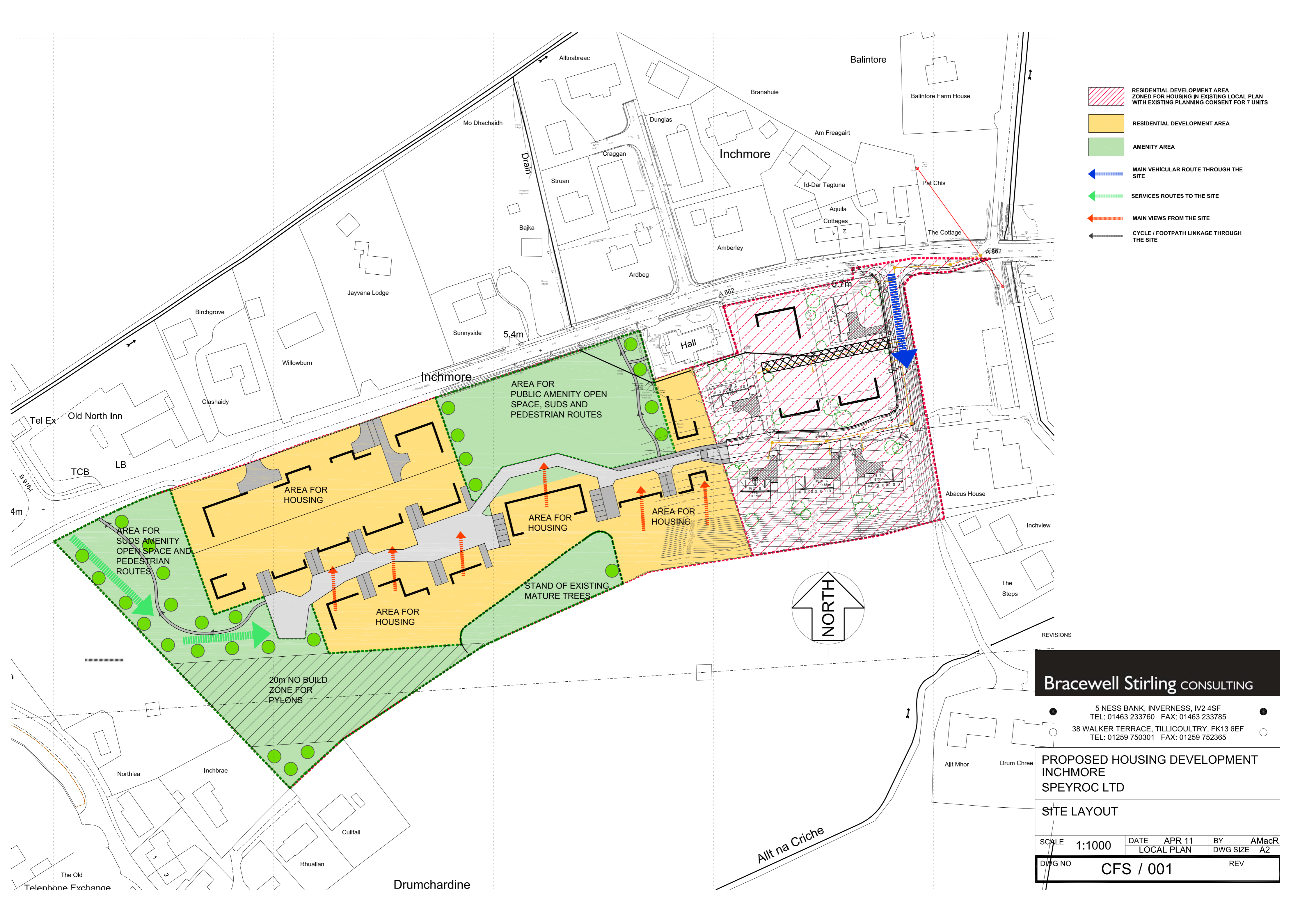
		habitats, habitats included on the Scottish Biodiversity List, non-designated habitats listed in Annex 1 of EC Habitats Directive?		
18	a) Will the site affect any protected species?  b) Will the site affect any other important species for the natural heritage?	a) Will the site affect any European Protected Species, Badgers and species (birds, animals and plants) protected under the Wildlife and Countryside Act 1981 as amended. If such a species may be present on or near the site, a survey should be carried out to inform this assessment (for which a licence from SNH may be required)  b) Will the site affect species listed in the UK and Local BAPs, the Scottish Biodiversity List and relevant annexes of the EC Habitats Directive?	Probably not  Unlikely	Surveys will be undertaken where applicable.
19	Is the site proposed to provide any form of renewable energy?	For example, will the site provide or be capable of providing a district heating system, solar panels or a wind turbine?	Yes.	Likely to be solar panels or wood burning stoves to supplement oil fired heating systems.
20	Is any part of the site at risk from fluvial or coastal flooding as shown on SEPA's flood map or from local knowledge?	Are you aware of any part of the site being within the 1 in 200 year flood risk contour as identified by SEPA? (which can be found here: <a href="http://www.sepa.org.uk/flooding/flood_risk_maps/view_the_map.aspx">http://www.sepa.org.uk/flooding/flood_risk_maps/view_the_map.aspx</a> )	No	
21	Will development of the site result in the need for changes in land form and level? If yes, how will soil and drainage issues be addressed?	Will there be any change in rate, quantity, quality of run-off plus groundwater impact on or off site? If so, will these affect priority habitats, especially blanket bog?	No – full SUDS measures will be designed and implemented.	
22	Is there a watercourse, loch or sea within or adjacent to the site? If yes, how will the water environment be protected from	Will there be any culverting, diversion or channelling of existing watercourses?	No	

	development?			
23	Will the site offer opportunities for sustainable waste management?	Will the waste produced by the site be minimised and processed close to source in a sustainable way?	Yes	
24	Can the site be connected to the public water and sewerage system?	Can the site be connected at reasonable cost? If not, what alternative is proposed?	Yes	
25	Will the site require alteration to the local landform?	Can the site (including access) be developed without significant re-contouring etc.? Will access tracks and parking areas have significant cut and fill?	Yes. Site will be relevelled to tie in with existing levels.	No. Sympathetically balanced cut and fill works will be undertaken to minimise any movement of material to or from site.
26	Will the site affect or be affected by coastal erosion or natural coastal processes?	This will be noted on any relevant shoreline management plan.	No	
27	Is the site sheltered from the prevailing wind and does it have a principal aspect between SW and SE?	Will development make best use of the site in terms of energy efficiency?	Yes	
28	Will the site have any impact upon local air quality?	Is the site near areas of employment or close to public transport? Such developments are less likely to result in additional traffic which may contribute to air pollution.	No	The site is on a major bus route and the site is at an existing bus stop and will create a new bus stop.
29	Will the site have an impact on light pollution levels?	Is it likely that the Council policy likely will require street lighting at this location? Are there proposals for floodlighting on the site?	Not significant – all lighting designed to avoid light pollution.	
30	a) Will it the site affect the present green network of the area?  b) Will the site provide opportunities to	a) Will the site affect features that currently provide for the movement of species and/or people e.g. woodland, hedgerows, field margins, watercourses, coastlines, tree belts, greenspace?  b) Will connectively of natural features or open space and paths used for public	Yes  Yes - integrated open space and natural habitats will be included.	New public amenity areas will be created in heart of village, maximising use of existing pedestrian and cycle links.

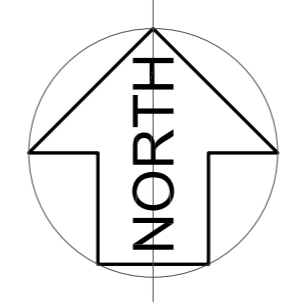
	enhance the present green network of the area?	amenity be improved? Will existing fragmentation of habitats and open spaces be improved? Will species be enabled to move where at present there is an obstacle?		
31	Will the site provide opportunities for people to come into contact with and appreciate nature/natural environments?	Is the site close to (within 1.5km) an opportunity to come into contact with nature/natural environments e.g. Local Nature Reserves, local greenspace, green networks? Are there proposals which will increase opportunities to come into contact with nature/natural environments?	Yes	Yes good links already existing.
32	<p>a) Will the site affect any core paths or right of way?</p> <p>b) Will the site affect any other existing paths or outdoor access opportunities?</p> <p>c) Will the allocation provide new access opportunities within the site and linking to the path network beyond the site?</p>	<p>a) Is a diversion of a core path or right of way required? Will there be any impact on the usability of a core path or right of way?</p> <p>b) Will it affect an existing path in the Highland Path Record? Will it provide additional access opportunities or adversely affect access opportunities afforded by the Land Reform (Scotland) Act 2003?</p> <p>c) Will new paths be created within and beyond the site? Will any existing paths be improved e.g. to increase accessibility to a wider range of users? Will the site help to realise priorities identified in the Council's outdoor access strategy or aspirational paths identified in the core path plans?</p>	<p>No</p> <p>No</p> <p>Yes within site – good connectivity can be achieved</p>	
33	Will the site have an impact on the geodiversity of the area?	Are you aware if the site lies within or adjacent to an un-notified Geological Conservation Review site or Local Geodiversity Site? (or other site with geodiversity value e.g. distinctive landforms, areas with natural processes, rock exposures for study?)	No	
34	Will soil quality and capability of the site be	Will the site result in a loss of soil due to development or removal of good quality soil	No- soil excavated will be re-used on site or locally.	



	adversely affected?	from the site? Is the site on land identified as Prime Quality Agricultural Land?		
35	Is the site on peatland?	Is the site within or functionally connected to an area of peatland? Would the allocation involve the disturbance of peat? If yes, how would impacts on peatland be avoided or minimised? Would any tree felling be required?	No	
36	Will the site have any affect on the viability of a crofting unit?	Does the site represent a significant loss of good quality inbye crofting land or common grazing land?	No	



- RESIDENTIAL DEVELOPMENT AREA ZONED FOR HOUSING IN EXISTING LOCAL PLAN WITH EXISTING PLANNING CONSENT FOR 7 UNITS
- RESIDENTIAL DEVELOPMENT AREA
- AMENITY AREA
- MAIN VEHICULAR ROUTE THROUGH THE SITE
- SERVICES ROUTES TO THE SITE
- MAIN VIEWS FROM THE SITE
- CYCLE / FOOTPATH LINKAGE THROUGH THE SITE



**Bracewell Stirling CONSULTING**

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**PROPOSED HOUSING DEVELOPMENT  
 INCHMORE  
 SPEYROc LTD**

**SITE LAYOUT**

SCALE	1:1000	DATE	APR 11	BY	AMacR
			LOCAL PLAN		DWG SIZE
					A2

DWG NO **CFS / 001** REV

SPEY ROC LTD

DRAINAGE IMPACT ASSESSMENT

HOUSING DEVELOPMENT  
INCHMORE  
INVERNESS-SHIRE



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### Document Status

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Prepared By:	L Emms
Checked By:	C Huggett
Authorised By:	C Huggett

This document has been reviewed for compliance with project requirements in accordance with HGA (UK) Ltd Quality Assurance Operational Procedures.

## 1.0 INTRODUCTION

The application site is located in Inchmore, Inverness-shire

The site is located adjacent to and on the south side of the A862 road. The site is situated between Inchmore Primary School and Inchmore Hall and will accommodate 8 dwellings.

The total area of the application site is approximately 1.0 ha.

Refer to Site Plan as Proposed by Thomas Robinson Architects Drawing number 324:02Rev G.

## 2.0 TOPOGRAPHY

A topographical survey was carried out by Aspect Land and Hydrographic Surveyors in June 2005. This was supplemented by further survey carried out in July 2006 outwith the site to include adjacent water courses.

The site is reasonably level but low lying (below 5.5m OD) over half the area then rises to a terrace feature at the toe of a steep slope forming the southern boundary of the site.

Overhead electricity pylon and cables are located to the south of the site.

The site is currently a green field covered with rough grass. The flatter area to the north of the site is at a level slightly lower than the adjacent road. This area is noted on the survey as a "marsh area".

## 3.0 SITE INVESTIGATION

A site investigation was carried out in June 2006 mainly to determine the drainage characteristics of the ground and to indicate the general foundation conditions for the house construction.

Nine trial pits were excavated over the area of the site and two trial pits excavated and prepared for percolation tests.

The site was dry at the time of the investigation but areas of poor drainage were apparent on the low lying ground.

The ground conditions comprised topsoil over the site covering a firm to stiff clay. Over the low lying area the clay became soft to firm with some fine sand pockets. Material was often fissured and water seepages were common. On the slope the firm to stiff layer was thinner overlying medium dense sandy gravel.

The variable and thin layer is a crust over the site but poor ground conditions with marine clays should be expected over much of the site.

Drainage measures and ground improvement should be considered in the low lying part of the site. Percolation characteristics over the low lying area are poor.

## 4.0 SUDS DESIGN

Surface water drainage design will be in accordance with Scottish Water development guide 'Sewers for Scotland' and CIRIA C609 Sustainable Drainage Systems.

With poor percolation characteristics particularly within the low lying area, individual soakaways to deal with the surface water from the houses would not be appropriate. To satisfy SEPA requirements, some form of attenuation and treatment will be necessary prior to a controlled discharge to the adjacent water course.

The post-development flows would need to be limited to that of the pre-development flow.

Scottish Water are currently applying the requirements of 'Sewers for Scotland 2'. This is in draft only but Scottish Water have advised they will now only adopt the following types of SUD systems:

1. Detention Ponds
2. Detention Basins
3. Underground Storage

Other systems can be utilised by developers but Scottish water would not adopt these and they would remain as private systems.

All ponds or basins should be located in passive public open spaces with a minimum distance of 30m between any domestic dwelling and the access way around the pond.

The site plan as proposed has no allowance for any public open space and the introduction of a pond or basin will have significant impact on the layout of the plots.

Some form of filter drain and/or use of permeable paving within the drives to each plot would provide some attenuation and treatment prior to discharging into the Scottish Water system. The system will need to discharge to the stream to the east of the site but this will require the raising of the floor levels of Plots 1-4.

The road drainage could be accommodated by utilising a system of filter drains and swales, but this will also require an outlet to the adjacent water courses.

Wayleaves will need to be agreed for any off-site works.

## 5.0 PRE AND POST DEVELOPMENT RUN-OFF

Given the sloping nature of the site and the presence of sandy clay, the pre development discharge from the site will be approximately as follows (CiriaC609 Figure 4.1):

Evapotranspiration	40%
Run off	10%
Shallow Infiltration (Interflow to watercourse)	30%
Deep Infiltration (recharging ground water)	20%

Post development, the proportions will be approximately as follows (Ciria C609 Fig. 4.2):

Evapotranspiration	35%
Run off	30%
Shallow Infiltration (Interflow to watercourse)	25%
Deep Infiltration (recharging ground water)	10%

In order to reduce the run off rate and allow any shallow infiltration, surface water will be stored on the development site in shallow filter drains below permeable block paving. Due to the poor infiltration rates, a controlled discharge will be taken to the surface water sewers and then to the adjacent water course.

Pre development flows were calculated in accordance with Institute of Hydrology Report 124 – Flood Estimation for Small Catchments.

These are summarized as follows:

### R124 Input

- AREA = 0.49ha
- SAAR = 900mm
- SOIL = 0.4
- URBAN = 0.0
- REGION = 1

### Pre development flow:

- Qbar = 3.7 l/s
- Q30 = 7.0 l/s
- Q200 = 10.5 l/s

Sufficient storage will be provided on site to restrict the post development discharge to that of the pre development flow.

Given the urbanised nature of the site and the lack of any natural path for flood flows, the system will be checked for a 1 in 200 year return period storm of 1 hour duration release at the pre development rate.

The filter drains and soakaways will also provide treatment of the run off. Given the small area of the proposed development, the treatment volume is calculated based on a fixed rainfall depth of 15mm, all in accordance with CIRIA C609 Table 4.3.

$V_t = \text{Impermeable area} * \text{fixed depth}$

$V_t = \text{Treatment Volume}$

Impermeable area = 5,000 m<sup>2</sup> (i.e. impermeable fraction approximately 50%)

Fixed depth = 15mm

Therefore  $V_t = 5,000 * 0.015 = 75 \text{ m}^3$

Volume below driveways =  $400 * 0.35 = 140 \text{ m}^3$

Volume in filter drains =  $300 * 0.5 * 1.0 = 150 \text{ m}^3$

Total treatment =  $140 + 150 = 290 \text{ m}^3 > 75 \text{ m}^3$  therefore OK

The storage could therefore be adequately provided by the use of permeable paving within the plots.

## 6.0 WASTE WATER DESIGN

Foul sewerage will be designed in accordance with Scottish Water design guide Sewers for Scotland.

Scottish Water have stated in their letter of 28 May 2004 that a foul connection could be made to an existing sewer adjacent to the "Cottage" east of the site.

It is important to note that Scottish Water are currently advising that they are unable to reserve capacity and connections to their system and connections will only be accepted on a first come first served basis.

The levels in the existing system at the above connection point are such that the proposed development will not be able to connect with a gravity system unless the finished floor levels to Plots 1-4 are raised.

A pumping station would provide an alternative means of connection. Again the proposed site plan does not allow sufficient room for a pumping station to Scottish Water standard specifications and a location off-site, possibly in the adjacent field, will need to be agreed.

Alternatively individual private packaged pumping stations could be utilised for the lower plots 1 – 4 with small pumping mains to discharge to the adopted Scottish Water sewers with the road.



## **7.0 WATER**

Scottish Water, in their letter of 26 May 2004, have stated that a connection can be made to the existing 125 HPPE main located in the A862 taking a 90 HPPE main into the site. It should be noted that the Scottish Water drawing of their water services in the area do not show a 125 HPPE pipe. This may be a new main recently installed but this will have to be confirmed with Scottish Water.

It is important to note that Scottish Water are currently advising that they are unable to reserve capacity and connections to their system and connections will only be accepted on a first come first served basis.

## **8.0 MAINTENANCE**

Maintenance of the drainage network will be in accordance with the framework agreed between Highland Council and Scottish Water.

Scottish Water will be asked to adopt the Foul gravity sewers.

The Highland Council will adopt the road drainage

Adoption of the SUDS system will be dependant upon the type of system utilised for the development. An underground tank system will be adopted by Scottish Water.

Permeable block paving soakaways, filter drains, individual pumping stations where utilised and all public open spaces within the development will be maintained by private factor.

# APPENDIX A

## Site Investigation Report

## **VAL EVANS**

### GROUND ENGINEERING & GEOLOGY CONSULTANT

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Ref: VLE 2006/28  
16<sup>th</sup> June 2006

For the attention of L Emms

Dear Sirs

#### **Inchmore, Speyroc Ltd** **Trial Hole Investigation and Percolation Tests.**

#### 1. INTRODUCTION:

A housing development is proposed at the site. A trial pit investigation and percolation tests were carried out to establish the general foundation conditions for house construction and to determine the drainage characteristics of the ground.

Nine exploratory trial pits were excavated by machine and two further pits were prepared for percolation tests. Water ingress occurred in one percolation test pit and no test was attempted. The pit was extended and used as an exploratory hole.

The field work was carried out on the 14<sup>th</sup> June 2006.

The approximate locations of the trial pits are given on the attached plan.

#### 2. SITE DESCRIPTION:

The site is located beside the A862 road in an area of rough pasture. The ground is low lying (below 5.5m OD) beside the road and then rises to a terrace feature at the toe of a steep slope forming the southern boundary of the site. This slope is mapped as an old coastal raised beach feature.

The site was generally dry at the time of the investigation but areas of poor drainage were apparent on the low lying ground.

#### 3. TRIAL PIT RECORDS

It should be noted that no laboratory tests were carried out on any soil samples and that the descriptions of the materials encountered were assessed by visual examination only.

	<b>Depth (mm)</b>	<b>Description</b>
<b>Trial Pit 1</b>	0 - 350	Vegetation (sedge) and TOPSOIL with roots.
	350 - 1000	Firm blue grey and orange brown mottled CLAY with rootlets and some decomposed plant fibres.
	1000 – 1800	Soft fissured blue grey CLAY with some black decomposed plant debris.

Pit prepared for a percolation test but water seepages occurred and the hole was extended. Ground water seepages below 0.8m. The pit walls were stable and vertical. The trial pit was excavated east to west.

	<b>Depth (mm)</b>	<b>Description</b>
<b>Trial Pit 2</b>	0 - 300	Vegetation (sedge) and TOPSOIL with roots.
	300 -700	Stiff to firm orange brown and blue grey mottled CLAY with rootlets, some rounded gravel and some cobbles.
	700 -2000	Soft to firm fissured blue grey CLAY with some black decomposed plant debris.

Ground water seepages below 0.7m. The pit walls were stable and vertical. The trial pit was excavated east to west.

	<b>Depth (mm)</b>	<b>Description</b>
<b>Trial Pit 3</b>	0 – 800	Vegetation and TOPSOIL.
	800 - 1000	Firm to stiff, fissured, grey brown, orange brown and light grey mottled very silty CLAY with some mixed gravel.
	1000 – 1800	Medium dense light brown slightly silty very sandy rounded to subangular fine to coarse GRAVEL with occasional cobbles. Becoming damp below 1.4m. Small boulder at 1.6m.

The pit was left open for 40mins but remained dry. The pit walls were dry, stable and vertical. The trial pit was excavated east to west.

	<b>Depth (mm)</b>	<b>Description</b>
<b>Trial Pit 4</b>	0 – 300	Vegetation (sedge) and TOPSOIL with roots.
	300 - 800	Stiff becoming firm, fissured, grey and orange brown mottled CLAY with a few rootlets and decomposed plant fibres. With damp fissure surfaces below 0.6m
	800 – 2100	Soft fissured faintly laminated, blue grey CLAY with some black decomposed plant debris and some fine sand pockets

Ground water seepages below 0.7m. The pit walls were stable and vertical. The trial pit was excavated east to west.

	<b>Depth (mm)</b>	<b>Description</b>
<b>Trial Pit 5</b>	0 – 1400	Vegetation and TOPSOIL.
	1400 - 1550	Brown very silty sandy subangular to subrounded fine to coarse GRAVEL. (Assessed medium dense to dense).
	1550 – 1900	Dense light brown red brown and orange brown mottles clayey fine to medium SAND matrix with mixed gravel.

The pit was left open but remained dry. The pit walls were dry, stable and vertical. The trial pit was excavated north to south.

	<b>Depth (mm)</b>	<b>Description</b>
<b>Trial Pit 6</b>	0 – 500	Vegetation (sedge) and TOPSOIL with roots.
	500 -1000	Stiff fissured, blue grey, light grey and orange brown mottled CLAY with rootlets.
	1000 – 1900	Firm fissured blue grey CLAY with some black decomposed plant debris and wood fragments. Becoming wet and soft on fissure surfaces. Becoming sandy and with rounded gravel at base of pit.

Ground water seepages from 1.2m and below. The pit was left open for 30mins and 150mm of water accumulated in the base of the pit. The pit walls were stable and vertical. The trial pit was excavated north to south.

	<b>Depth (mm)</b>	<b>Description</b>
<b>Trial Pit 7</b>	0 – 500	Vegetation (sedge) and TOPSOIL with roots.
	500 - 900	Firm fissured, blue grey, light grey and orange brown mottled CLAY with rootlets.
	900 – 2150	Soft fissured faintly laminated, blue grey CLAY with some black decomposed plant debris, wood fragments and some fine sand pockets and wet on fissure surfaces.

Ground water seepages from 1.4m and below. The pit walls were stable and vertical. The trial pit was excavated north to south.

	<b>Depth (mm)</b>	<b>Description</b>
<b>Trial Pit 8</b>	0 – 650	TOPSOIL with Vegetation and roots.
	650 - 850	Stiff fissured grey and orange brown mottled silty CLAY with rootlets.
	850 – 1800	Dense brown slightly silty very sandy rounded to subrounded fine to coarse GRAVEL with occasional cobbles. Becoming loose to medium dense and wet below 1.4m.

Ground water seepages from 1.4m and below. The pit walls were unstable and concave below 1.4m. The trial pit was excavated north to south

	<b>Depth (mm)</b>	<b>Description</b>
<b>Trial Pit 9</b>	0 – 350	Vegetation (sedge) and TOPSOIL with roots.
	350 - 650	Firm to stiff fissured, blue grey with a little orange brown mottling CLAY.
	650 – 1700	Soft to firm fissured faintly laminated, blue grey CLAY with some black decomposed plant debris, wood fragments.

Ground water seepages from 0.7m and below. Field drain intercepted at 0.65m. The pit walls were stable and vertical. The trial pit was excavated north to south.

#### 4. SUMMARY OF THE STRATA DESCRIPTION:

Topsoil was between 0.3 and 0.5m thick on the lower ground but up to 1.4m was recorded in TP 5 at the toe of the steep slope.

The low lying area comprises a weathered and firm to stiff fissured multi coloured CLAY with rootlets between 0.3m and 0.65m thick becoming a soft to firm blue grey CLAY with some decomposed organic material and sometimes with fine sand pockets. This material was often identified as fissured and water seepages were common.

On the slope a thin layer of firm to stiff fissured silty CLAY often with some gravel was found to over lie medium dense to dense brown silty very sandy GRAVEL. Trial pits excavated in this material were dry to approximately 1.4m below ground level but became damp or seepages occurred below, (TP 8).

#### 5. DISCUSSION:

Topsoil was encountered throughout the site and was particularly thick down slope of the coastal feature on the southern boundary of the site. These materials are unsuitable for foundations and will require removal.

A variable and thin layer of more competent material can be expected as a 'crust' but poor ground conditions with marine clays should be expected over much of the site. It is understood that some flooding occurs on the lower lying ground.

The trial pit locations were approximate but it appears that as the ground rises above 7m OD gravels can be expected below an increasing thickness of topsoil.

It is understood that the proposed development is for domestic housing. It is recommended that the area of higher ground underlain by gravels should provide adequate foundations. Ground water levels appear to be low at the time of the site investigation and the material becomes less competent if disturbed or if ground water seepages occur. Provided there is adequate drainage of the slope to the south and **there is no disturbance caused by water ingress** an allowable bearing pressure of 100kN/m<sup>2</sup> can be assumed for normal strip foundations placed 250mm into the gravel.

The foundations should incorporate A252 mesh placed at the bottom of the foundation concrete.

All foundations must be a minimum of 450mm below finished ground level.

Foundations could be placed on the 'crust' associated with the marine clays but this material is likely to be variable in thickness and will be rapidly softened with increasing moisture content. Drainage measures and ground improvement should be considered in the low lying part of the site before final foundation designs can be considered.

V.L.Evans  
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**PERCOLATION TEST:**

Infiltration Coefficient:  $q = \frac{V_{p75-25}}{A_{p50} \times t_{p75-25}}$

Where:

$V_{p75-25}$  = Volume of pit between 25% and 75% of depth (m<sup>3</sup>)

$A_{p50}$  = Wetted Area of pit at 50% of depth (m<sup>2</sup>)

$t_{p75-25}$  = Time for pit to drain from 75% to 25% full (hours)

**TEST PIT**

Test	PIT DIMENSIONS			$V_{p75-25}$ m <sup>3</sup>	$A_{p50}$ m <sup>2</sup>	$t_{p75-25}$ hr	q m/hr
	LENGTH m	WIDTH m	DEPTH m				
1	0.55	0.80	0.5	0.11	1.115	2.16667	0.04553
2	0.55	0.80	0.5	0.11	1.115	2.61667	0.0377
Average							0.04162

**Site Infiltration Value                      I                      = 41.6 mm/hr**

**Infiltration Value                              Vp                      = 86 sec/mm**



## INFILTRATION TEST READINGS

### Test Pit

Test Section: 550x800mm  
Date: 14/6/2006

Pit Base: 1.3m

<b>Test 1</b>	<b>Time 100% - 75%</b>	<b>Time 75%-25%</b>
Start	10 <sup>47</sup>	11 <sup>05</sup>
Finish	11 <sup>05</sup>	13 <sup>15</sup>
Duration	<b>18 mins</b>	<b>130 mins</b>

<b>Test 2</b>	<b>Time 100% - 75%</b>	<b>Time 75%-25%</b>
Start	13 <sup>21</sup>	13 <sup>50</sup>
Finish	13 <sup>50</sup>	16 <sup>27</sup>
Duration	<b>29 mins</b>	<b>157 mins</b>

