

An Evaluation of Tornagrain

A Scottish New Urbanist Town





F0.1 - Front Cover Graphic Personally edited from Early Tornagrain Concept Illustration
F0.2 - Early Tornagrain Concept Illustration [https://pinimg.com/originals/8c/fc/3b/8cfc3b9b39cd18008fd5acff762a279].jpg]



Executive Summary

This report aims to evaluate the growing New Urbanist settlement of Tornagrain, which is located in the Scottish Highlands, and communicate an understanding of how this project was informed by Poundbury and in turn informs Chapelton.

Tornagrain qualifies as a megaproject by virtue of its brief which shares characteristics of other projects with comparable scale and cost and through contextual framework it describes the premise for Tornagrain's conception.

To evaluate the development, a critical evaluation framework was devised. It analyses the key components of Moray Estates Development Company's (MEDCO) front end planning which sought to understand it's established counterpart in England. It utilised a charrette workshop to provide opportunity for early community engagement. From both of which a design was formulated to ensure the New Urbanist fundamentals within its Scottish context.

However, the phased project is significantly behind schedule. A more comprehensive understanding of endogenous and exogenous risks will clarify the factors responsible for this delay. At this stage, the potential for its success is evident but achieving this is dependent on continued risk mitigation and adherence to its design code.



F0.3: Tornagrain Drone Footage
Jonentz, D., 2019. [image] Available at: <<https://lytimg.com/vi/pr8Ca18Jlil/maxresdefault.jpg>> [Accessed 17 December 2020].

F0.4 Poundbury Aerial Footage
Poundbury, n.d. Poundbury Aerial Footage. [image] Available at: <<https://ftanda.co.uk/urbanism/queen-mother-square-poundbury-dorset/>> [Accessed 17 December 2020].



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1.1 Tornagrain as a Megaproject

As defined by Greiman: there are **25** recurrent characteristics found within mega projects which distinguish themselves from regular developments. These go beyond the scale and cost of a project, looking into the complexity and management of issues which frequently arise. However, each mega project is unique and demonstrates these characteristics to varying degrees. To equate Tornagrain as a mega project the following evaluation was conducted, indicating the relevance of each characteristic.

R1.0: Greiman, V., 2013. Megaproject Management: Lessons On Risk And Project Management From The Big Dig. John Wiley & Sons, Inc, Hoboken, New Jersey, pp.12-24.

F1.0 - F1.2: Personal Tables

Characteristic	Relevance	Explanation
Long Duration	High	Tornagrain's brief is expected to take 50-60 years to complete.
Scale & Dimension	High	Andrew Howard (MEDCO Managing director) stated that in its entirety, Tornagrain would cost £1.65 Billion.
Type of Industry & Purpose	Medium	It is part of a larger framework (A96 growth corridor) to which £326 million is required for the infrastructure. Costs to be distributed through all stakeholders involved in the larger framework.
Design and construction complexity	High	A provision of 5000 homes, with provision of educational, commercial, leisure and services included.
Sponsorship and financing	High	Larger framework is both public and private sector funded. Tornagrain brief requires 25% of homes to be of affordable tenure. Government grants and private sponsorship was accepted.
Life Cycle	High	Tornagrain sets to become a small town created over several phased additions of varying density.
Long Complex and Critical Front End	High	The concept of Tornagrain was conceived in 2002, it was not until 2013 that a planning application was approved.
High Public Profile	High	Given the scale of development, multiple subdivisions of the government and private stakeholders are involved.
Public Scrutiny	High	Multiple opportunities of engagement with public were arranged over the course of front end planning.

Characteristic	Relevance	Explanation
Pursuit of a large scale policy making	High	Seeks to become accepted as a more effective and profitable way of implementing residential developments compared to volume house building which sticks to the status quo.
Project delivery and procurement	High	Heavy emphasis on front end planning.
Continuity of Management	High	Moray Estates are client, sole developer and land owner which incentivises a long term interest in management.
Technological and procedural complexity	Medium	Technology related to reducing carbon footprint of built houses to net 0 by 2030.
Organisational Structure	Medium	A good mixture of different stakeholder types, however they are not intercontinental.
High Degree of regulation	High	Design Code created to inform all future planning applications within development.
Multiple Stakeholder	High	Through conception to current stage of construction (Phase 1B) There is over 20 identified stakeholders
Dynamic Governance structures	High	A96 Growth Corridor brings with it multiple stakeholders which all must be governed to different degrees.
Ethical Dilemmas and challenges	High	Given high reliance on engagement with community to which some believe to be a marketing ploy to guarantee house sales.

Characteristic	Relevance	Explanation
Consistent cost underestimation and poor performance	High	MEDCO was surprised by the amount required investment to get a planning application granted.
Risk Management in Complex Projects	High	Implications of Brexit, COVID-19 and economic recession of 2008 and its effect on the A96 Development.
Socioeconomic impacts	High	MEDCO seeks to create multiple jobs and commercial units at Inverness Airport Business park. This may further remove commerce from the local city of Inverness' waning Highstreet.
Cultural Dimension	Low	
Systems and Methodology complexity	Low	
Environmental Impact	Medium	Change of land use from agricultural to build environment. Also implications of maintaining low carbon footprint as part of low carbon initiative.
Collaborative Contracting, Integration and Partnering	Medium	Multiple contractor / engineering stakeholders involved.



1.2 Socioeconomic Context

There are many socioeconomic factors at play that must be considered when anticipating the development, reception, and premise of Tornagrain, including: the economic growth of Inverness, the composition of its population, how these are expected to progress and the speculative role of Tornagrain on this progression.

The location, bridging the Highlands and the more southern cities of Scotland, has earned Inverness the moniker of the hub of the North. Tourists travelling between the major cities and scenic Highlands stop to visit various attractions such as Inverness Castle which overlooks the namesake River Ness. Tourists can also easily access Loch Ness via the Caledonian Canal which also runs through the city.

The population of the Scottish Highlands rose by **8%** between **2012–2018** (from **217,450** to **235,540**) and this is projected to reach a population of approximately **236,664** before **2028**. This is an increase of **0.5%** over **10** years, which may not

seem a dramatic increase but, because of the scarcity of settlements within the Highlands, is rather significant.

More than a quarter of the Highlands' population lives within the periphery of Inverness, an infant city that is recognised as its capital. It is acknowledged as the fastest growing city in Scotland, with an increase in population of **15%** since **2001** and amounting to an estimated **64,000** in **2019**. This growth extends as far as Nairn which grew to **10,710** in the same period.

Infrastructural improvements are partly responsible for increased tourism, which in turn contribute to the increase in population. These improvements include changing the A96 and A9 road from Perth from a single to a dual carriageway in line with Transport Scotland's economic growth plan and the addition of flight destinations such as Amsterdam to Inverness's nearby airport.

Economic growth is evident from increases in the local property values, **81%** between



R#.# Project Scotland, 2020. Inverness announced as Scotland's fastest growing city. [online] Available at: <https://projects.cot.com/2020/06/inverness-announced-as-scotlands-fastest-growing-city/> [Accessed 17 December 2020].

F1.3: Personal Image

2002 and **2012** alone, and salaries, up to **20%** in some instances, are attributed to a surge in workforce relocation spurred by concentrated recruitment efforts by progressive Invernesian business owners.

This net migration has played a key role in the overall population growth of the Highlands between **2012–2018**, with an estimated population increase of **715** exclusively within Inverness during **2015**. The recruitment drives responsible for much of the overseas labour force moving to Inverness are naturally expected to diminish with Britain's withdrawal from the European Union. This, in turn, is a contributing factor to the Highlands' population increase being limited to only **0.5%** in the next 8 years.

However, the economic boon from increased tourism and influx of migrant workers has also presented an issue for the less affluent population of the Highlands. Particularly within Inverness, tourism has increased the amount of characteristic property being purchased

R#.# Weldon, V., 2013. Scottish City Property Prices Rise Most in UK. The Herald, [online] Available at: <https://pressreader.com/article/281530813393581> [Accessed 17 December 2020].

R#.#: Pretoria News, 2019. Shortage of EU migrant workers threatens Scotland's Economy. [online] Available at: <https://pressreader.com/article/281741270764854> [Accessed 17 December 2020].

and utilised as largely vacant holiday homes and highly profitable hotels and B&Bs. This gentrification of the inner city has exacerbated a housing shortage which the Highland Council intends to mitigate with the construction of affordable housing. Consequently, this can be expected to lead to an influx of car-centric suburban sprawl, a matter which has historically scourged the agricultural land around the city of Inverness since the **1980s**.

Tornagrain's development has to-date weathered both the Economic Global Recession of **2008** and the duration of the COVID-19 pandemic through to the construction of Phase 1B. However, due to the latter, there is evidence that we have entered another period of economic downturn which must also be endured. The implications of, and precautionary measures against, this can be found within **2.15** Exogenous Risks.

R11- Nrsotland.gov.uk, 2019. Highland Council Population Estimates. [online] Available at: <https://www.nrscotland.gov.uk/files/statistics/council-area-data-sheets/highland-council-profile.html> [Accessed 17 December 2020].

R12- 2012. POPULATION PROJECTIONS FOR COUNCIL AREAS 2010 - 2035. [online] The Highland Council, pp.1-2. Available at: <http://www.highland.gov.uk/download/downloads/id/11051/council_area_population_projections_2010> [Accessed 17 December 2020].

R13-Citypopulation.de, 2019. Nairn (Highland, Scotland, United Kingdom) - Population Statistics, Charts, Map, Location, Weather And Web Information. [online] Available at: <https://www.citypopulation.de/en/uk/scotland/highland/s19001083__nairn/> [Accessed 17 December 2020].

R14-Citypopulation.de, 2019. Inverness (Agglomeration, Agglomerations, United Kingdom) - Population Statistics, Charts, Map And Location. [online] Citypopulation.de. Available at: <https://www.citypopulation.de/en/uk/agglo/s20000479A__inverness/> [Accessed 17 December 2020].



1.3 Planning Policy Context

The National Planning Framework (NPF), initiated in **2004**, is a governmental response to the need for new housing. It is consistently being reviewed and aims to project areas of sustainable growth with development and infrastructure projects. Within NPF1, the Inverness and Moray Firth areas are identified as having suitable potential for economic growth in light of recent population growth.

The A96 development framework was laid out in **2004** with the intention of furthering and sustaining economic growth in the Inverness and Moray Firth areas. Within **35** years it plans to change the A96 into a dual carriageway, accommodate **30,000** homes through several developments such as Tornagrain, construct a new business park (IABP) at Inverness Airport opposite the Tornagrain site and create a rail halt on Moray Estate land.

In NPF2 (**2009**) it is communicated that not all new homes “can be built on previously developed land” and thus highlights Tornagrain as a development of **5,000**

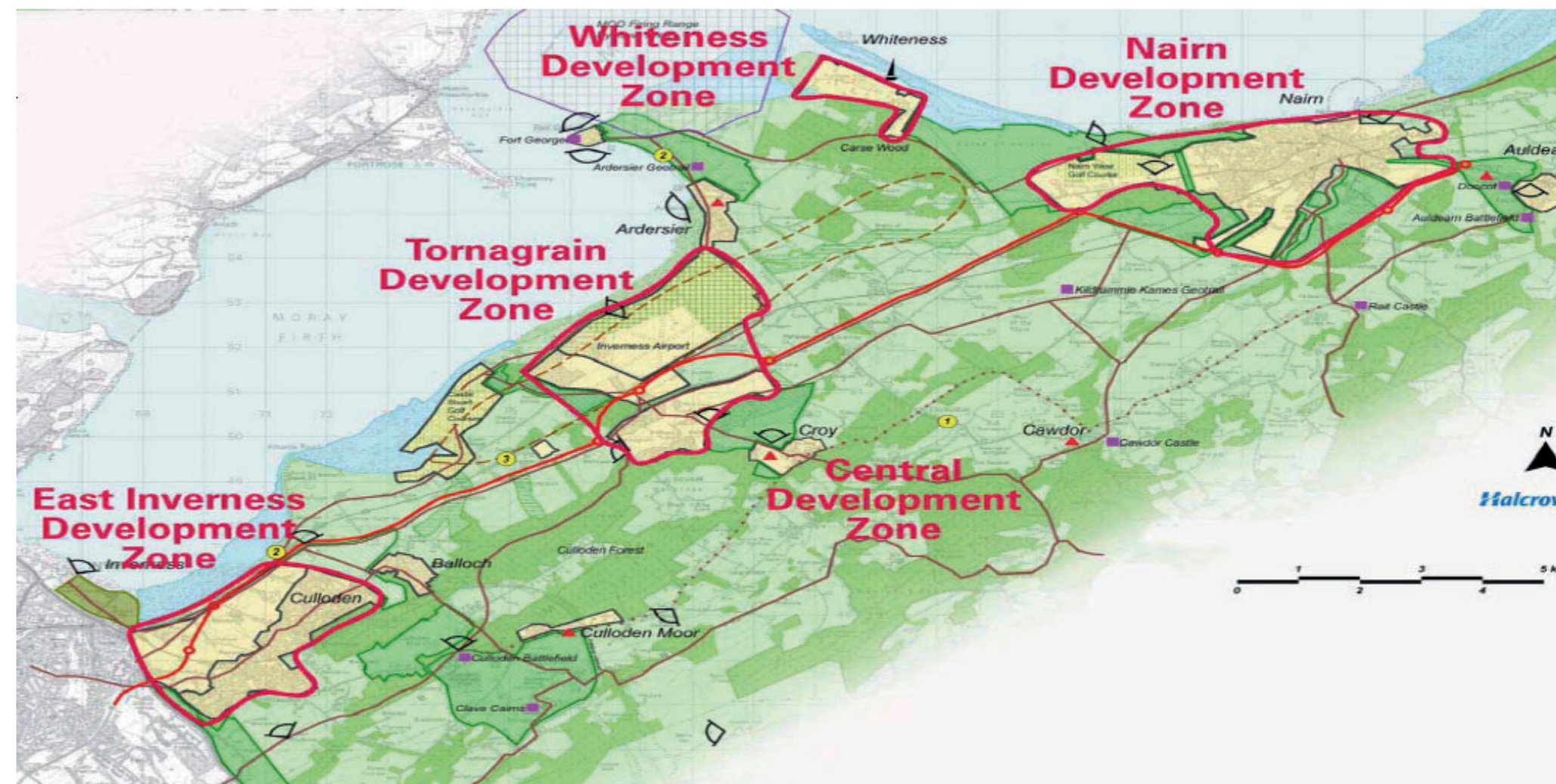
homes intended to be built in rural land in line with the A96 development framework. It is also stated that the data extrapolated regarding population and housing needed is based on indicative past trends rather than predictive. Reflecting on the governmental aspirations for economy and populace growth, which are implied to surpass the indicated projections, it is stated that “planning should reflect this, to ensure a generous supply of land for housing.”

NPF3 projected that **30,000** houses will be delivered in Scotland from **2011** to **2016** and advocates for the delivery of affordable rural housing in conjunction with improved access to higher education, jobs and public transport to focus on the retention of younger demographics within more rural areas.

The Scottish Government, **2014**. Scotland’s Strategic housing investment plans (SHIPs) were created by local authorities to assess the demand of housing within their jurisdiction over **5**-year periods.

They also inform the Affordable Housing Supply Programme (AHSP) which guides the Government’s investment decisions in local developments.

Since **2016**, the Highlands SHIP has committed to a provision of **500** affordable homes per annum. Together, the Inverness and Nairn areas are targeted to receive **50%** of this stipulation. Local developers, which includes Moray Estates are contractually obligated through Section **75** agreements to designate **25%** of total residential units as affordable housing.



R15- The Scottish Government, 2004. NATIONAL PLANNING FRAMEWORK FOR SCOTLAND. [online] The Scottish Government, pp.19, 30, 49-76. Available at: <web.archive.org.uk/wayback/archive/20180517124856/http://www.gov.scot/Publications/2004/04/19170/35317> [Accessed 17 December 2020].

R16- The Highland Council, 2007. The A96 Growth Corridor Development Framework. [online] Halcrow, pp.33-40. Available at: <https://www.highland.gov.uk/downloads/file/6382/a96_development_framework>. [Accessed 17 December 2020].

R17- The Scottish Government, 2009. National Planning Framework For Scotland 2. NPF. [online] The Scottish Government, pp.10-11, 86. Available at: <https://www.gov.scot/publications/national-planning-framework-scotland-2/> [Accessed 17 December 2020].

R#-#-Third National Planning Framework. [online] The Scottish Government, pp.21, 86. Available at: <https://www.gov.scot/publications/national-planning-framework-3/> [Accessed 17 December 2020].

R18- The Highland Council, 2020. Strategic Housing Investment Plan 2021-2026. [online] The Highland Council. Available at: <https://www.highland.gov.uk/download/meetings/id/77250/item_6_-_strategic_housing_investment_plan> [Accessed 17 December 2020].

R19 Parliament.scot. n.d. Strategic Housing Investment Plans. [online] Available at: <https://www.parliament.scot/parliamentarybusiness/CurrentCommittees/105204.aspx#:-:text=Strategic%20Housing%20Investment%20Plans%20(SHIPs,in%20the%20local%20housing%20strategy,&text=Of%20the%2050%2C000%20affordable%20home%20targets%2035%2C000%20are%20for%20social%20rent.> [Accessed 17 December 2020].

F14: A96 Corridor Development Zone Halcrow, 2007. [image] Available at: <https://www.google.com/url?sa=i&url=http%3A%2F%2Fwww.highland.gov.uk%2Fdownload%2Fdownloads%2Fid%2F6382%2Fa96_development_framework.pdf&psig=AOvVaw0IA-z2TwYAXEEYK4HkIe8A&ust=1608385918653000&source=images&cd=vie&ved=0CAIQjRqFwoTCPCYhc3W1-0CFQAAAAAABAO> [Accessed 17 December 2020].



2.1 Evaluation Framework

To evaluate the success of Tornagrains implementation based on the intrinsic need of such a development evidenced from the contextual analysis of the previous sections; a critical framework will discuss the following topics:

2.2 Front End Planning

- 2.3 Land Ownership
- 2.4 Securing Funding
- 2.5 Establishing Design Team
- 2.6 Establishing Principles
- 2.7 Project Feasibility
- 2.8 Project Governance
- 2.9 Stakeholders
- 2.10 Design Code
- 2.11 Phased Delivery
- 2.12 Community Engagement
- 2.13 Relation with Governance

2.14 Project Marketing

2.15 Project Impact

2.16 Risk Strategy

- 2.17 Endogenous Risk
- 2.18 Exogenous Risk

From here an evaluation based on this framework of the stated topics informed by relevant literature regarding megaprojects and property development processes will be made.



2.2 Front End Planning

Although expensive, front end planning is widely recognised as mandatory practise within any project to mitigate factors which would otherwise prevent or delay a successful outcome. A general strategy would consider feasibility of the project and its objectives by analysing related sector markets and socioeconomic data trends. At the same time it might identify relevant stakeholders and design teams members which would provide experienced consultation to aid the analysis.



2.3 Land Ownership

The rural land that Tornagrains and the IABP is established on is part of the estate of John Douglas Stuart, the 21st Lord of Moray. It is managed by Moray Estates Development Company (MEDCO) and, prior to development, it existed as agricultural land which was leased out to local farmers. However, the potential for increased land value through the process of property development was a great incentive to diversify their asset portfolio which largely outperforms the annual existing revenue from land leasing. It is idealised by Lord Moray to establish an urban legacy which pays homage to the 10th Lord's feudal properties which constitute part of Edinburgh's New Town.

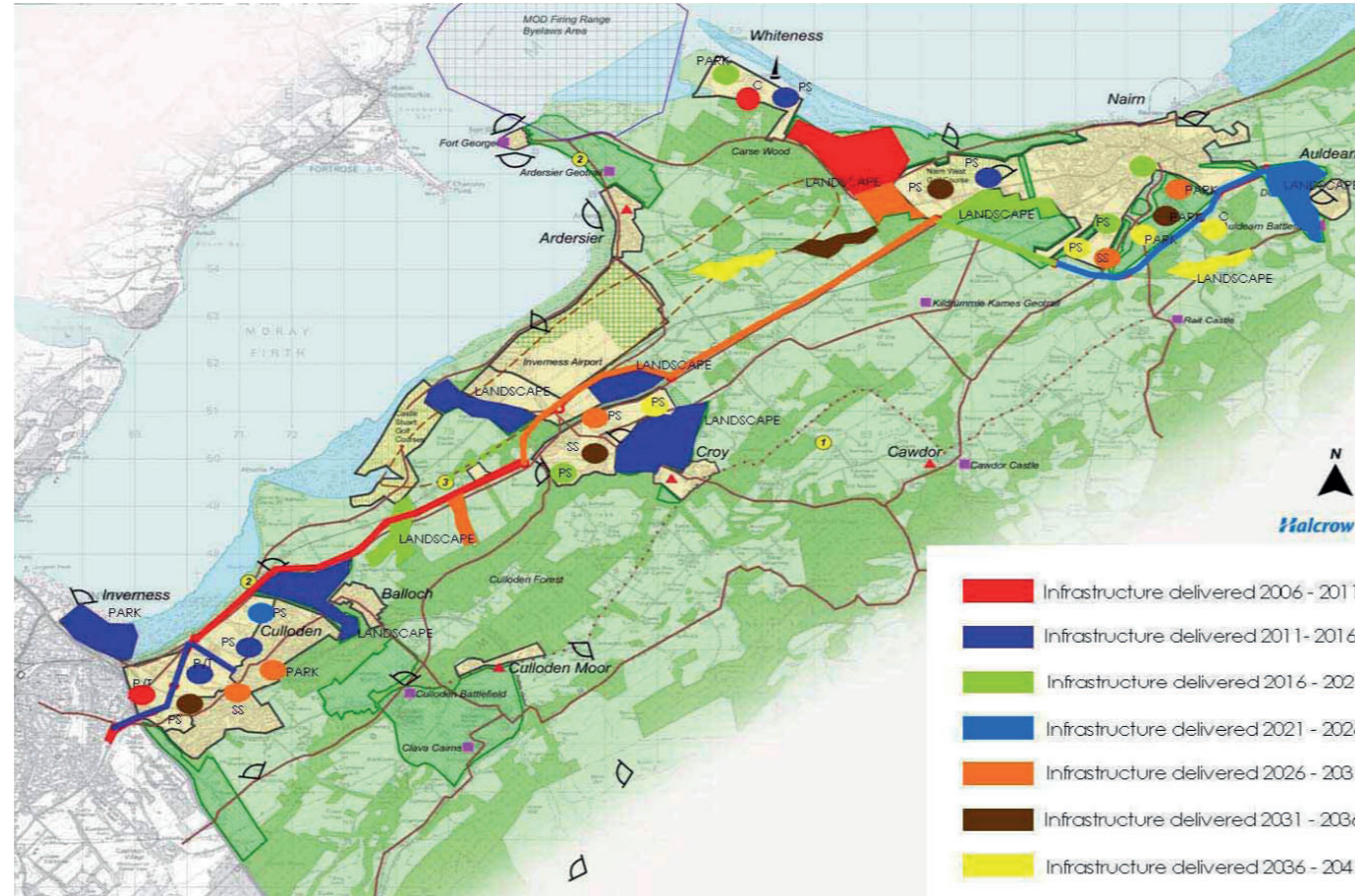
R2.0- Morayfe.com, n.d. History - Lord Moray's Feu. [online]. Available at: <https://www.morayfe.com/history/> [Accessed 17 December 2020].

F2.0-make architects, 2019. Inverness Airport Business Park With Tornagrains Site Below. [image]. Available at: <https://www.e-architect.com/images/jpgs/scotland/inverness_airport_business_park_make180308_1.jpg> [Accessed 17 December 2020].

2.4 Securing Funding

Following site analysis conducted during the pre-planning phase, a substantial cost to make on-site was the redirection of an existing Oil MOD pipeline which will be re-laid around and away from the development's sub structure.

Additionally, with the development of this private land comes the contribution to the A96 infrastructure and affordable housing costs through section 75 agreements. In 2006, the estimated total infrastructure costs amounted to £326.23 million. 71% (£230.9 million) of this will be privately funded. Tornagrain and IABP are identified under the Dalcross region within the A96 Framework. Provided with public funding via THC to the amount of £16 million, Moray Estates will need to contribute a further £50 million to infrastructure over the several decades of development. MEDCO estimate that Phase 1 (2015-present) constitutes £6.28 million in infrastructure costs to date, which has been privately sponsored by the Bank of Scotland for £5.5 million



R21- The Highland Council, 2007. The A96 Growth Corridor Development Framework [online] Halcrow, pp.33-40. Available at: <https://www.highland.gov.uk/downloads/file/6382/a96_development_framework> [Accessed 17 December 2020].

R22- Tornagrain Limited, 2019. Unaudited Financial Statements For The Year Ended 30 June 2019. [online] Saffery Champness, p.5. Available at: <https://find-and-update.company-information.service.gov.uk/company/SC336825/filing-history> [Accessed 17 December 2020].

R23- Business.bankofscotland.co.uk. 2016. Moray Estates Development Company Ltd. [online] Available at: <https://business.bankofscotland.co.uk/case-studies/moray-estates.html> [Accessed 17 December 2020].

2.5 Establishing Design Team

When the Highland Council (THC) first approached MEDCO in 2002 with the prospect of a housing development as part of the A96 framework, THC had envisioned that this would be comprised of multiple settlements strewn along the A96. After much deliberation, it was agreed with THC in 2004 that MEDCO's scheme would assimilate the multiple smaller settlements into one small town over a longer time period.

To gain an appreciation of what a sustainable settlement, as briefed by THC, may look like in the context of the Moray Firth area members of MEDCO travelled to existing examples within the UK, Europe, and the USA. During this period, they met with experienced consultants who would later join or advise Tornagrain's design team.

The most infamous was Andres Duany of Duany Plater-Zyberk & Company (DPZ), who at that time had already master planned several settlements within the USA based on New Urbanist principles. He was brought on to lead the 9 day charrette workshop (2006) which was arranged in tandem with other public engagement opportunities by Turnberry Consulting. The results of which are addressed later in section (2.12).

It was DTZ, an Edinburgh-based socioeconomic consultancy which provided an economic forecast based on analysis conducted on the area. This analysis substantiated the premise of Tornagrain's brief of 5000 homes, jobs created by both Tornagrain and the IABP and the potential return on MEDCO's investment.

The architect, Ben Pentheath, and quality sustainable home builders, ZeroC Holdings Ltd, were both vital members of Poundbury's development. Their wealth of experience which could be used in Tornagrain's development was recognised by MEDCO at Turnberry's advice. They were both offered contracts, to which they both accepted.



F2: Bohl, C. and Plater-Zyberk, E., n.d. The Transect Plan. [image] Available at: <https://webpages.uidaho.edu/iarc453/images/formBased/transect.jpg> [Accessed 17 December 2020].



2.6 Establishing Principles

Through this research, MEDCO sought to understand what had gone wrong in existing cities such as Inverness. They concluded that growth is not the issue but rather the way that growth was accommodated. This is addressed within section (2.7).

Based on this, MEDCO established the following principles prior to the 2006 charrette. They were then further honed by DPZ, other consultants and 600 members of the local community in attendance.

1. It will be a compact town, scaled for the pedestrian rather than the motorist.
2. It will be large enough to support an excellent range of community and leisure facilities plus appropriate local shops.
3. It will contain a wide but integrated range of homes for different household sizes and incomes.
4. It will have excellent public transport, walking and cycling connections to Inverness, Nairn and the airport business park.
5. It will generate new employment and will be integrated with major local employment centres.
6. It will complement the surrounding landscape and take advantage of existing buildings, landscape features and views.
7. It will incorporate innovative environmental measures, designed to minimise consumption of natural resources, and reduce dependence on main infrastructure
8. It will be the centre of architectural excellence and innovation in the Highlands.
9. It will encourage local town management and will actively foster a sense of pride and civic responsibility.
10. It will enjoy planned growth, so that all the above objectives are met at each stage of its development.

R2.4-Doone, J., 2006. Tornagrain, Charrette Edition: A Planned Town For The Highlands. [ebook] Moray Estates Development Company Ltd. Available at: <<https://www.scribd.com/document/447042864/Tornagrain>>. [Accessed 17 December 2020].



2.7 Project Feasibility

At the other end of the UK within county Dorset resides Poundbury, an extension to the town of Dorchester. The estate of land belongs within the Duchy of Cornwall, which is currently stewarded by Charles, the Prince of Wales – the founder of The Prince’s Foundation.

The town of Dorchester, like the majority of settlements has lost sight of the human scale, segregating residential and commercial property catering more to motorists and large retailers, this subsequently made it a good example of suburban sprawl. It is particularly comparable to Inverness, despite having very different housing prices and land values, because of its adjacency to Poundbury which is so similar in intent to the settlement of Tornagrain.

With help of Léon Krier, a now infamous advocate of New Urbanism, to employ the Prince’s ambitions, Poundbury has been constructed as a contradictory model to the sprawling suburbs derived from post-war housing schemes built around the car.

R2.5- Ratcliffe, J., Stubbs, M. and Keeping, M., 2009. Urban Planning and Real Estate Development. 3rd ed. Routledge, p.215.

The community-focused pedestrian housing model implemented in Poundbury serves to integrate the residential and retail property on the main street and create walkable, human-scale neighbourhoods.

This approach, defined by integration of purposes, employment of local materials, regard for the location’s personality and activity and the portrayal of community values proved to be a successful return on investment thanks to a steadfast adherence to its principles. The focus on mixed unit types, a plenitude of quality affordable housing and ecologically sustainable features provided an integration of livelihood, different demographics, and nature respectively.

The general consensus at the time of Poundbury’s conception was that its ambitions were unattainable. And now, with the resonating success it has had in the prevention of suburban sprawl and the excellent value it provides to shareholders positions it as a role-model for ‘good

R2.6- George, C., 1987. A Speech By HRH The Prince Of Wales At The Corporation Of London Planning And Communication Committee’s Annual Dinner, Mansion House, London | Prince Of Wales. [online] Princeofwales.gov.uk. Available at: <<https://www.princeofwales.gov.uk/speech/speech-hrh-prince-wales-corporation-london-planning-and-communication-committees-annual>> [Accessed 17 December 2020].

R2.7-Ratcliffe, J., Stubbs, M. and Keeping, M., 2009. Urban Planning and Real Estate Development. 3rd ed. Routledge, p.214.

R2.8-Crowhurst Lennard, S., n.d. Poundbury Today | International Making Cities Liveable. [online] Livablecities.org. Available at: <<https://www.livablecities.org/articles/poundbury-today>> [Accessed 17 December 2020].

growth’. This value stems from responsible stewardship and extends well beyond housing to the reduction of maintenance costs from quality construction materials, provision of employment opportunities and stimulation of the local economy beyond that attributed to construction work.

The success of sustainable developments such as this, while thorough and well-documented, are conditional on being allocated sufficient time to be nurtured by a landowner with the commitment to long-term participation and fidelity to the design code established at the outset.

As evidenced by analysis conducted by The Princes Foundation, there is financial incentive to choose this model over that of the mass house developer. It is a longer term but wiser investment to those who can afford to wait, in that people recognise the inherent value in sustainable focused communities. The mixed-use approach has the benefit of flexibility as needs change over time with the market, spreading risk over multiple sectors.

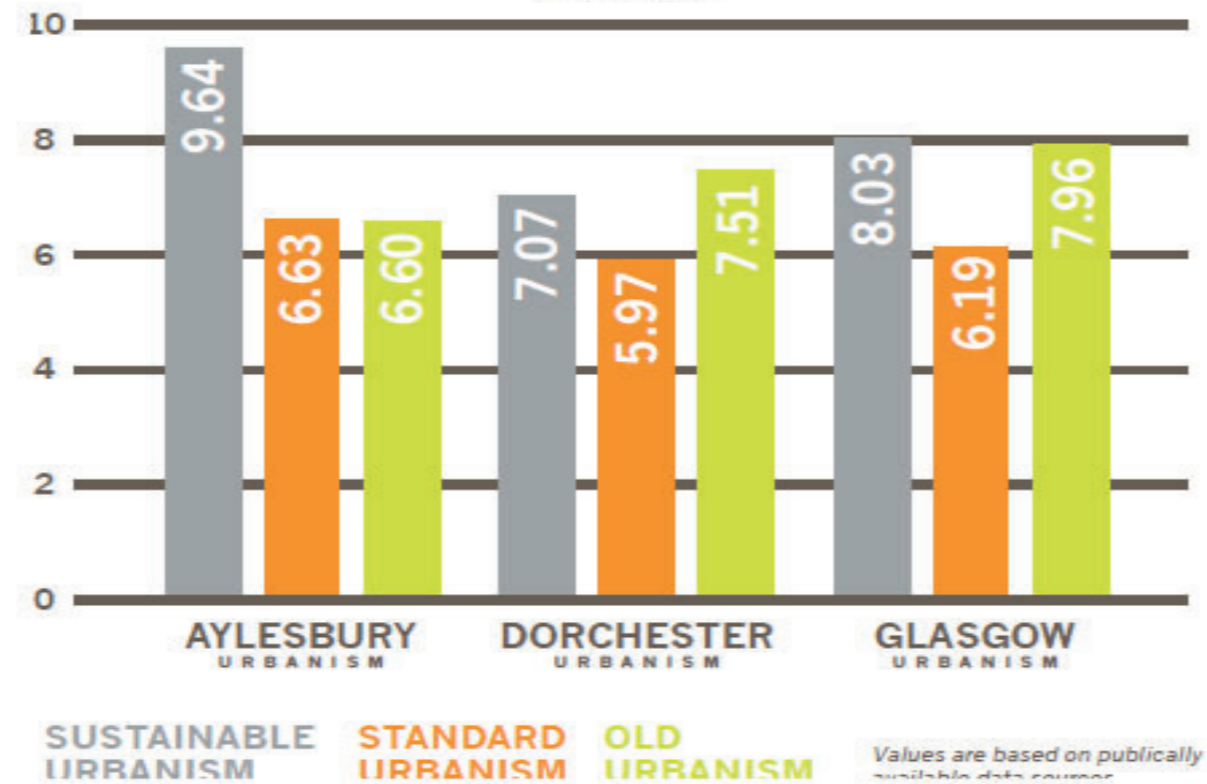
R2.9-Knight Frank, 2020. Cost And Value: Building Better, Building Beautiful Commission. [online] Knight Frank, pp.11, , 45. Available at: <<https://content.knightfrank.com/research/1930/documents/en/building-better-building-beautiful-commission-cost-value-2020-7017.pdf>> [Accessed 17 December 2020].

2.7 Project Feasibility Cont.

"We're going to be around for a long time, so we're incentivised to do a good job"
(Lord Moray 2019)

It was MEDCO's understanding of the precedent model and the path of delivery for success which gave confidence to go ahead to formulate a design code derived from Poundbury's with their chosen principles to base Tornagrain on. This sentiment on the part of Lord Moray is as good an example of the dedication to be expected of a responsible stewardship role as per the spirit of Prince Charles' philosophy.

Total Market Value of Buildings per Hectare of Built Residential Land
(Value £m)



"If we had worked with a development partner, there wouldn't have been enough value in the land to make it attractive to a developer and leave anything left over for us. It has been expensive, but we don't regret it because we have complete control of a project that will probably go on for the next 50 years," going on further to say, "We can wait for our payback because we're not sitting on targets where we have to make our investment back in five years like so many companies."

(Lord Moray 2019)

2.8 Project Governance

This could be considered synchronistic of APM's definition of project governance, which is stated as: "the framework of authority and accountability that defines and controls the outcomes and benefits from projects, programmes and portfolios"

However, it could be argued that without Turnberry's consultation and connections, MEDCO might not have been able to reach the level of fidelity considered in the project's front-end planning. It was through their organisation of all the other consultants which led to the level of analysis required to put Tornagrain forward for public consultation which, also was arranged by Turnberry. They also claim responsibility for managing the planning application, ensuring the level of information within the supporting documentation was sufficient to gain approval.

R2.10- The Prince's Foundation, 2019. Housing Britain: A Call To Action. [online] The Prince's Foundation, pp.28-33. Available at: <<https://dl6zhuza4xzjgxc.cloudfront.net/files/housing-britain-2019.pdf>> [Accessed 17 December 2020].

F2.3- The Prince's Foundation, 2009. A Strategic Land Investment Model. Delivering Sustainable Urbanism. [online] The Prince's Foundation, p.5. Available at: <<https://dl6zhuza4xzjgxc.cloudfront.net/files/princesfoundation2009-strategiclandinvestmentmodel-a3a05c64.pdf>> [Accessed 17 December 2020].

R2.11- The Prince's Foundation, 2019. Housing Britain: A Call To Action. [online] The Prince's Foundation, pp.28-33. Available at: <<https://dl6zhuza4xzjgxc.cloudfront.net/files/housing-britain-2019.pdf>> [Accessed 17 December 2020].

R2.12 - Apm.org.uk. n.d. What Is Governance? | APM. [online] Available at: <<https://www.apm.org.uk/resources/what-is-project-management/what-is-governance/>> [Accessed 17 December 2020].



2.9 Stakeholders

Stake Holders to present date	Role	Benefit to Project	Interest (Other than Financial Profit)
Moray Estates Development Company / Tornagrain Ltd (MEDCO)	Client, Land Owner & Primary Developer	Land provision, Funding.	Increase value of owned land. Emulating the 10th Lord Moray's legacy within Edinburgh New Town with a new lifetime development. Diversifying Asset portfolio.
Inverness Airport Business Park Ltd (IABP) (Joint venture between Moray Estates, Highlands & Islands Airports Ltd, Highlands & Islands Enterprise)	Developing alongside Tornagrain	Key element of A96 Development .Reduces overall infrastructure costs to Tornagrain Development	Business Park to create jobs and local commerce to Tornagrain.
The Highland Council (THC)	Local Council	Helping Fund Infrastructure, Affordable Housing. Planning governance.	A96 Growth Corridor: Housing demands, affordable housing demands, economic opportunities.
The Scottish Government	Political Governing Body	Power to change planning policies, can provide funding, power to bypass local authority (THC)	A96 Growth Corridor: Housing demands, affordable housing demands, economic opportunities. SSCI
Turnberry Consulting Ltd	Project Manager, Public Consultation	Organised charrette, Full Consultation support, Prepared Planning Application. Provided invaluable knowledge to MEDCO when establishing objectives helped form an appropriate design team.	Diversifying portfolio of experience in Residential Estate Developments, went on to work on multiple others such as Chapelton of Elsick
Duany Plater-Zyberk & Co (DPZ)	Urban Planning Consultant	Led 2006 Charrette series, Experience in New Urbanism projects in USA	New Market of clients in Scotland, went on to work on multiple others such as Chapelton of Elsick, Knockroon
The Princes Foundation	-	Connections to relevant stakeholders/ design team, project recognition	Shares ideals of housing model.
ZeroC, on behalf of Places for People (Housing association)	Home Builder	Experience on similar projects such as Poundbury, Knockroon	Recognition associated with development, went on to win award 2019 now and work on Chapelton of Elsick
A&J Stephens Builders Ltd	Home Builder	Well-known local developer.	Recognition associated with development, went on to win award 2019 and now work on Chapelton of Elsick
Ben Pentreath Architects	Principle Architect, Master Planner	Experience on similar projects such as Poundbury,	New Market of clients in Scotland, Now also works on Chapelton of Elsick
Thomson Gray	Quantity Surveyor	Cost Advisers	Recognition associated with development, Now also works on Chapelton of Elsick
MGA Architecture	Architect for ZeroC	Building Warrant Drawings	Recognition associated with development

Stake Holders to present date	Role	Benefit to Project	Interest (Other than Financial Profit)
Brooks Murray	Architect for A&J Stephens	Building Warrant Drawings	Recognition associated with development, Now also works on Chapelton of Elsick,
Scottish Water	Water & Sewage Infrastructure Governance	(Mandatory as part of planning application)	Ensuring regulated infrastructure into their system. Association with project,
Bank of Scotland	Financial Sponsor	Infrastructure Funding	Association with project, Long term supporters of Moray Estates
Morrison Construction	Water & Sewage Infrastructure Contractor	Water & Sewage Infrastructure works	Association with project, continued frameworks with Scottish Water Horizon (commercial subsidiary of Scottish Water)
WSP	Road & Infrastructure Consultant	Road Infrastructure for Phase1	Association with project, Now also works on Chapelton of Elsick
DTZ	Socioeconomic Consultant	Analysis of population forecast of A96 Corridor Area	Association with project
Fabrik	Landscape Architecture Consultant	Formal & Non-Formal Landscape Planning	Association with project
WYG	Environment Consultant	Strategy for Low to Zero Carbon homes.	Association with project
Fairhurst	Civil Engineer Consultant	Redirecting existing Oil Pipe line which cuts through site to around site instead. Road Infrastructure for A96 Development Consultant	Association with project, Now also works on Chapelton of Elsick
Applied Ecology Ltd	Ecological Consultant	Conducted survey of existing wildlife and flora within project site	Association with project
Scott Wilson Scotland Ltd	SUDS Consultant	Conducted Site Flood Assessment	Association with project
R2.4-2.5: Personal Tables			

2.10 Design Code

Tornagrain's design code is intended to protect and enforce the 10 principles and vision defined by MEDCO through the consultation of its design team and is to be enforced in all planning applications throughout every phase of the brief's delivery. Within its literature it stipulates that "shall" defines an instruction as mandatory whereas "should" is recommended and "may" is optional.

It is also a measure to legally hold MEDCO and its respective design team at any time accountable, should they stray from the accepted terms of the original planning application according to the section 75 agreement. However, through consideration of the scope and long-term nature of delivering Tornagrain's brief, it makes certain allowances for flexibility as the code is parametric by design. This is to accommodate a genuine variety of architectural styles with use of different materials. With regards to Urban planning, it is more strict in order to prevent substandard spaces as a result of deviation from the code's guidance.

Aims are to be enacted as follows:

- Enabling the construction of the new town of Tornagrain as delineated in the master plan.
- Encouraging specific outcomes through incentives, rather than through prohibitions.
- Encouraging and protects development patterns that are mixed-use and pedestrian friendly.
- Preserving public civic space in the form of parks, squares and other community gathering places.
- Enabling architects and planners working within the town to continue adhering to the masterplan for decades to come.

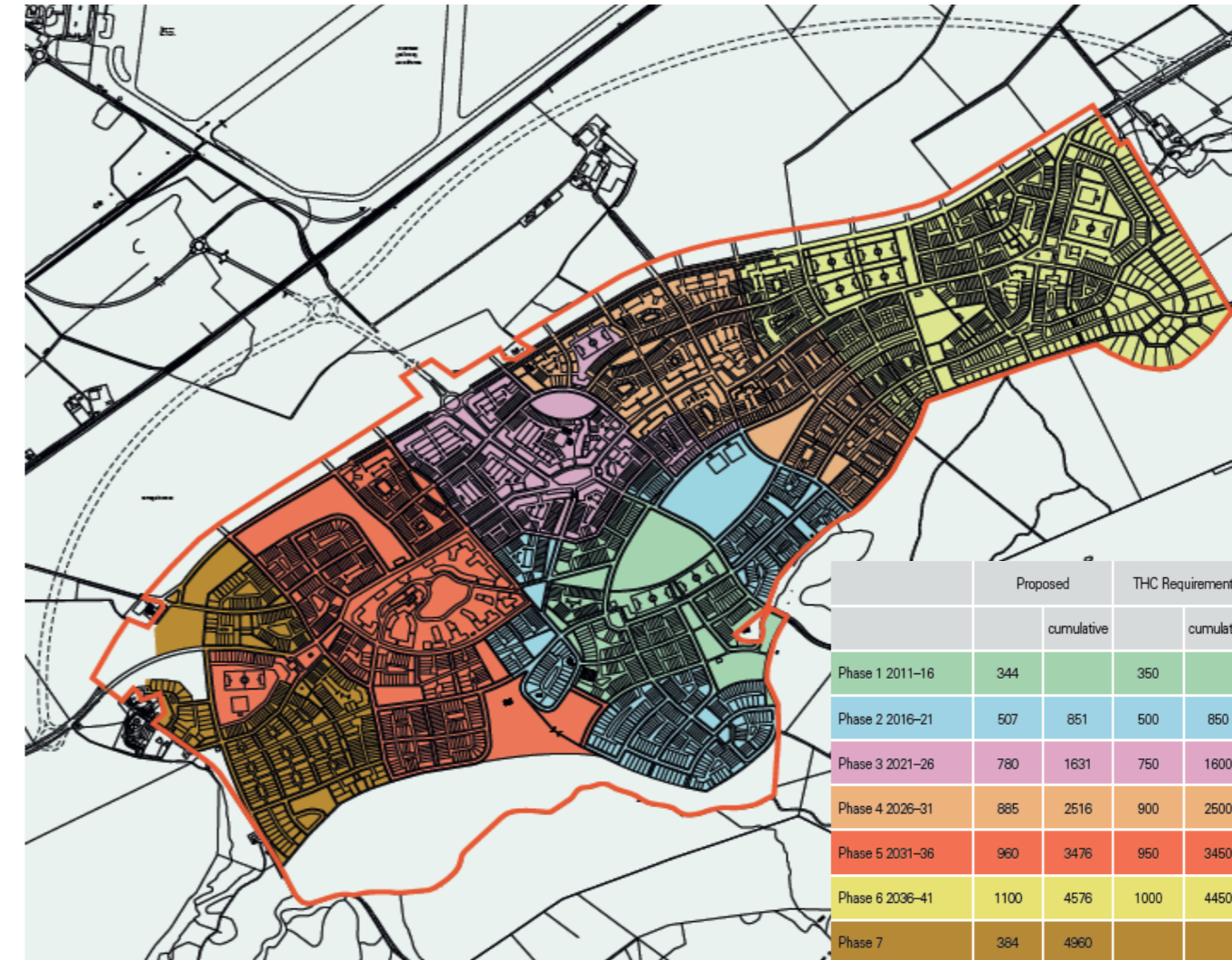
In the instance where there is a conflict with other codes, regulations, and standards it shall take precedent. The exceptions being for building regulations which have a primary jurisdiction over safety concerns and hazards.

R213- Moray Estates Development Company, 2009, Design Code January 2009. Tornagrain: A planned Town for the Highlands. [online] Moray Estates Development Company. Available at: <<https://wam.highland.gov.uk/wam/applicationDetails.do?activeTab=documents&keyVal=KDPO86IH01W00>> [Accessed 17 December 2020].

2.11 Phased Delivery

The total cost of infrastructure, property, and manpower required to undertake a brief this large at once would be unrealistic. It would also undermine the characteristic element of the town organically developing over time and would result in an impersonal atmosphere had it been intended to be built all at once. Therefore, Tornagrain was designated to progress as a phased development where a percentage of the total sum of 5,000 houses are built in accordance with THC's need for homes.

This method was beneficial for MEDCO and the other stakeholders in that it allowed the project to unfold with the opportunity to accrue all the necessary funding. This phased approach also permits the brief to aptly respond to risks and the changing needs of the Moray Firth area during its development. Furthermore, this timeline allows MEDCO and its stakeholders to sell property stock to maintain an adequate financial stream to further develop property and to gauge returns on investment more accurately. Finally, although unlikely and highly illegal because of section 75 agreements, it affords MEDCO the option to sell all the land at a profit now that planning permission has been granted - otherwise known as land banking.



F2.6: Moray Estates Development Co, 2009, Tornagrain Phasing Plan, MEDCO, Scotland

2.12 Community Engagement

In the early 2000s, there was an initiative through bodies such as the Prince's Foundation to increase public accessibility to voicing consultation on planning applications. The traditional method to expressing approval or objection towards an application was through written response to newspaper articles. Forward-thinking local authorities provided public consultation meetings to allow interested community members to voice their concerns with ease. This would later be governed in 2004, by means of an Act, stipulating that those applying for planning approval must state their efforts to involve public consultation through "Statements of Community Involvement."

Given the community-driven nature of Tornagrains principles and the aforementioned Act, Turnberry Consultancy highlighted the severe importance of community engagement from an early pre-project development stage through to the date of planning application submission. In doing so, they hoped this would improve public opinion

and generate interest, reducing fence-sitters, NIMBYists and prevent criticism formed from misunderstanding of the project's intentions which were backed by a depth of analysis.

Opportunities organised by Turnberry were diverse and well-advertised through a website and newspaper articles. The 9-day charrette sought to educate the public about the importance of the inherent sustainability that a community-focused development would provide. As part of this, Duany was invited to speak at the University of Highlands & Islands which addressed a larger demographic.

Those who could not attend the various meetings held by THC planning committee, the audience of which was a mixture of both public and consultants, could visit exhibitions held in subsequent years prior to a planning submission. These provided access to the improved analysis and developing design code submitted by the design team and other stakeholders. Information was available in brochures upon request to those failing to attend any of these. The statement of community involvement documenting its strategy was included as supporting

information within the planning application in 2012. As a result of this there were only 52 official objections to Tornagrains planning application which is relatively low considering the scale of development. These objections ranged from unhappy farmers and rural residents to those claiming that the information within the support material provided by MEDCO was still speculative. This mistrust was not unwarranted as many volume house developments have later fallen short of expectations set at the planning stage. It should be noted that five local community councils including Inverness had submitted objections.



R214-Ratcliffe, J., Stubbs, M. and Keeping, M., 2009. Urban Planning And Real Estate Development. 3rd ed. Routledge, p.19

F2.6-SSCI, 2011. Andres Duany At Charrette Series. [image] Available at: <<https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.gov.scot%2Fbinaries%2Fcontent%2Fdocuments%2Fgovscot%2Fpublicatio ns%2Ffactsheet%2F2018%2F06%2Fdumfries-and-galloway-council-planning-authority-core-documents%2Fdocuments%2Fcd61--- ssci-charrette-report-for-ladyfield-oct-10%2Fcd61---ssci-charrette-report-for-ladyfield-oct-10%2Fgovscot%253Aadocument%2FD-61%252BSSCI%252BCharrette%252Breport%252Bfor%252BLadyfield%252BOct%252B10.pdf&psig=AOvVaw3WwDLcFizUW-HnVReqR2oH&ust=1608398420271000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCNilgpeF2O0CFQAAAAAAdAAAAABAD>> [Accessed 17 December 2020].

2.13 Relation with Governance Stakeholder

THC categorised objections and other general comments of uncertainty, responding to these groups with blanket quotes referring to the NFPs & A96 framework as reaffirming analysis conducted by Tornagrains consultants. The disenfranchised councillors saw this as THC brushing issues under a metaphorical rug in order to ensure the development to go forward unobstructed. However, even though MEDCO's commitment to a long-term investment was likely appreciated by local governance, it did not provide them any shortcuts through their application. As a matter of fact, in 2012, Highland councillors were informed that "if Moray Estates' application was refused, the Estate would be likely to appeal to the Scottish government and win with potentially enormous costs borne by Highland Council" (Macleod 2013).

It was not until 2013 that Tornagrains was accepted for planning permission, delaying it by 2 years from where phase 1 of the development was anticipated to start 2011. However, the now-soured, THC

further prevented infrastructure works from commencing until 2015 as section 75 agreements were still in debate. This "planning gain", as Ratcliffe (et al 2009) describes, refers to the practice of developers contributing towards infrastructure necessary to facilitate their development as established as part of their A96 Framework commitment.

"Getting planning permission is an extremely onerous task, it is eye wateringly expensive... we had spent £5 million before getting a digger on site"

(Howard, 2020)



R215-Macleod, G., 2013. New Urbanism/Smart Growth in the Scottish Highlands: Mobile Policies and Post-politics in Local Development Planning, Urban Studies, [online] 50(1), p.211. Available at: <<https://journals.sagepub.com/doi/full/10.1177/0042098013491164>> [Accessed 17 December 2020].

R216-Ratcliffe, J., Stubbs, M. and Keeping, M., 2009. Urban Planning And Real Estate Development. 3rd ed. Routledge, p.19

R217 - Earl of Moray with Andrew Howard, Director of Moray Estates. 2020. [video] YouTube: Dorset-CPRE. [Accessed 17 December 2020].

F2.7 - ZeroC Holdings, n.d. Aerial Footage Of Phase 1A Tornagrains. [image] Available at: <<https://www.zeroc.co.uk/media/2465/tornagrains-set-1-4.jpg>> [Accessed 17 December 2020].

At time of writing, we are approaching 2021 which is when phase 3 was anticipated to start in Tornagrains original phasing plans. MEDCO are still 100 houses shy of the 344 stipulated within phase 1, with another 500 require in phase 2. This is likely a factor of underestimating the time and procedures for planning approval. Exogenous factors such as the 2008 economic recession, Brexit and COVID implications have likely affected this time frame too. This is to be analysed within the risk management section.

2.14 Marketing Impact

Duany's infamy stimulated much interest in the project from the media. Acclaim came from the Scottish Sustainable Communities Initiative (SSCI), a government project which set to "encourage the creation of places, designed and built to last, where a high quality of life can be achieved". The SSCI invited Duany to repeat the charrette process within other regions of Scotland. In 2011 Tornagrain was recognised as 1 of 11 exemplars, of which 4 are private land developments.

To contrast this, a lot of criticism from architects and academics was directed at Duany and by proxy, Tornagrain. Their discussion portrays New Urbanism as a marketing trojan horse for volume housing disguised with a pastiche vernacular skin. Poundbury has received similar criticism but remains confident, commenting that;

"At the end of the day, people vote with their feet. These houses sell at a premium and all we're saying is that we're going back to lessons learnt from the past and distilling them into new communities here."

(Managing director of Poundbury 2019)

MEDCO and similar venturing landowners can only weather these comments until their respective developments are completed. Only then can analysis sufficiently evidence whether or not these sustainable communities are a marketing ploy masquerading as having Poundbury's founding ideals.

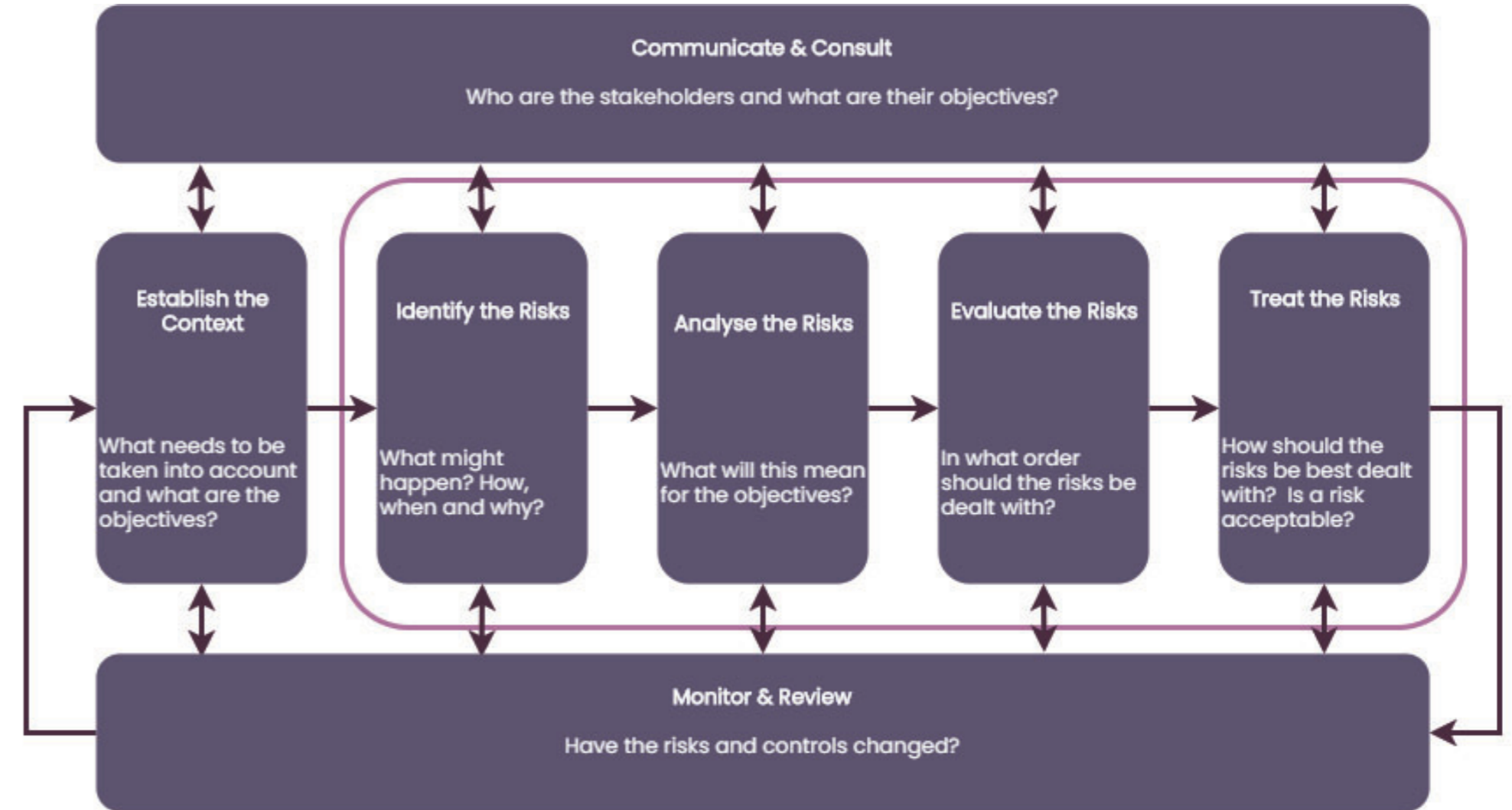
For their participation with Tornagrain phase 1a, the housing builders, ZeroC Holdings Ltd and A&J Stephens Ltd, were both awarded the "Private (Medium) Development of the year Homes for Scotland" which brought further recognition to the development through engagement with experienced stakeholders.

2.15 Project Impact

Since its inception in 2002, Tornagrain has been projected to be Scotland's largest New Urbanist settlement with 10,000 residents expected by late 2060's. Its current population of 425 is a fragment of that. They are well-settled and share a sense of community as demonstrated by their frequent gatherings on the formal green spaces created in the scheme. They still rely on Inverness for employment and commerce which will be brought to Tornagrain in later phases. It is unclear precisely how the community growth will be affected by delays in projected phasing but there are no apparent negative factors currently preventing the mixed demographic community from thriving here.

MEDCO's implementation of New Urbanist principles could be considered innovative within Scotland. Through DPZ and the SSCI these principles have inspired similar developments on privately owned estates such as Chapelton located in Aberdeenshire and Knockroon near Cumnock. Both of these have engagement from stakeholders who gained recognition from working on Tornagrain. It is unclear how MEDCO will effectively maintain its existing design team for future phases if they have seemingly divided their attention with other developments.

2.16 Risk Strategy



F2.8: Risk Management Strategy, Personal Diagram

R218-The Scottish Government, 2011. Charrette Series Report. [online] Scottish Sustainable Communities Initiative, p.4. Available at: <<https://www.webarchive.org.uk/wayback/archive/20170105054317/http://www.gov.scot/Topics/Built-Environment/AandP/Projects/SSCI>> [Accessed 17 December 2020].

R219-Prince Charles: Inside the Duchy of Cornwall. 2019. [video] Directed by C. Clay. BBC Studios.
R220- Scottish Housing News, 2019. CALA Crowned Home Builder Of The Year At Homes For Scotland Awards. [online] Available at: <<https://www.scottishhousingnews.com/article/cala-crowned-home-builder-of-the-year-at-homes-for-scotland-awards>> [Accessed 17 December 2020].

R221 - The Press and Journal, 2020. Newest town in the Highlands gets own Pharmacy as population rises. [online] Available at: <<https://pressreader.com/article/281792811578424>> [Accessed 17 December 2020].

2.17 Endogenous Risk

Inherent / Speculative Risk	Risk Factor	Consequences of Risk	Solution to Risk
Competition from increased developer interest in New Urbanist Developments.	Medium	Lost interest/ sales / value in property	Marketing Object to planning, Appeal to government to ensure developments are justified.
Tornagrain residents living in Permanent construction site / Living near to airport	Medium	Unhappy residents, Reduced interest	Regulate construction hours, Tree belts strategically placed to eliminate noise and to create visual interruption.
COVID-19	High	Long period of no work commencing on site, further putting development behind anticipated timeline in planning application. Physical and Mental health issues of stakeholders, Economy downturn	Insurance, Collateral, Provision to expedite infrastructure negotiations to make up for lost construction time, Improved appreciation of nature and community which is in line with Tornagrains principles. Government incentives to prevent economy downturn
Housing Crisis 2008	Medium	Decrease in economy, New homes were too expensive to be built and too expensive to be sold at expected prices. Increased existing housing prices	Affordable Housing Schemes and other Government funded grants.
Climate Change	High	Changes to requirement of environmental strategy, Increased property construction costs and research of new technologies. Increase in material costs, taxes on concrete due to carbon content.	Phased Design, Forward thinking
Infrastructure Delays / Increase in costs	High	Money lost to rented equipment on site	Sue responsible parties to recur costs. Evaluate infrastructure strategy for cheaper alternatives.
Brexit	Medium	Scotland Independence - Perhaps new policies implemented, Reduction in the need for homes. Smaller available workforces due to EU migrants returning home, Increase in cost of imported material Dramatic change in value of the £	Invest in stable currency, Source local materials, Invest in trade internships to create more interested youth in sector. Similar to what the Prince's Foundation is investing in. Phased development model. Scotland Independence - Perhaps new policies implemented
Stakeholder bankruptcy / Maintaining Funding	Medium	Further delays	Employ Financial manager, Keep stakeholders engaged and happy by meeting their demands when not in large conflict of project

F2.9-2.10 – Personal Risk Tables

2.18 Exogenous Risk

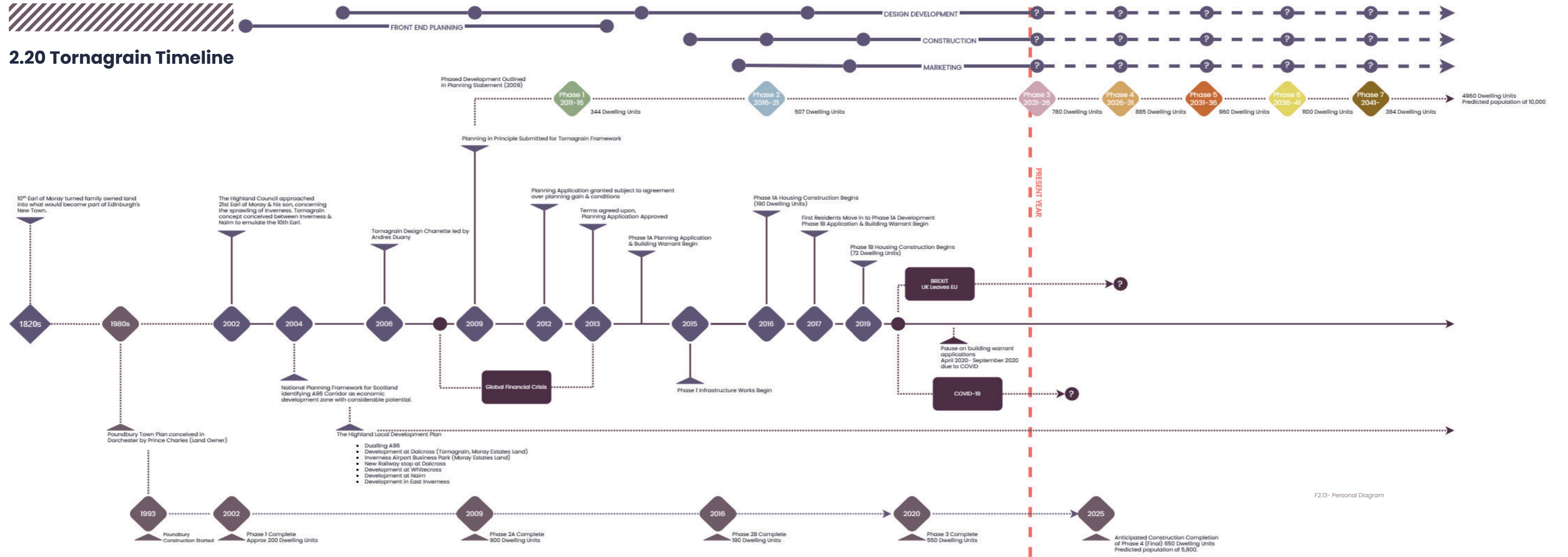
Inherent / Speculative Risk	Risk Factor	Consequences of Risk	Solution to Risk
Securing Funding	High	Project not taken beyond FEP stage, Deterioration in quality or smaller scale of development. Project Delayed	Design Team comprised of those who have worked on similar projects give confidence to client, council and investors. Lord Moray and Moray Estates have a lot of collateral assets Government Recognised Exemplar Development through SSCI.
Design Team / Stakeholders	High	A poorly considered, unexperienced design team would waste time and money arriving, if not falling short of the clients expectations of project. Poor consideration of design	Turnberry
Poor Market Research	High	Inaccurate goals set	Reevaluate analysis
Poor Community Engagement	High	Alienated community, potentially a greater amount of N.I.M.B.Yism and misinformed comments on planning application. Would go against Tornagrain's community	Turnberry
Site Analysis	medium	Delays to construction brought about by issues not identified earlier. Could lead to prevention of construction if policies enforced by environmental governance are not met.	Detailed landscape framework report conducted within Planning package looking at; the Moray Firth Region as a whole, Site constraints, existing infrastructure, boundaries of
Commitment to Infrastructure & Affordable Housing through Section 75.	High	Bankruptcy. Tied to developer obligations	Notifying stakeholders ahead of time that you are headed for debt. Apply for loan.
Project Duration 50-60 years.	High	Stakeholder fatigue. Straying from design code	Experienced design team and committed stakeholders. Frequent reassessment of risks

2.19 Front End Planning Evaluation

Identified Factors	Strengths	Weaknesses	Success Rate	Reflective Improvements to FEP
Land Ownership	Land already owned by developer.		High	None
	Weighed loss of land lease compared to increase of land value from development.			
	Oil MOD pipeline was quickly identified as needing redirected.			
Securing Funding	MEDCO has substantial assets which could act as collateral.	Had sponsorship been acquired sooner MEDCO would have not argued with THC.	Medium	Approach more funding streams and sooner.
	Sponsorship from Bank of Scotland essential to starting infrastructure works.			
Establishing Design Team	Design Team were largely comprised of experience contractors and those who had worked on Poundbury.	Although highly valuable, contractors have limited workforce and therefore difficult to be spread around several projects.	High	Consider hiring more contractors (Which will likely happen in later phases)
Establishing Principles	established early to give community and stakeholders a clear understanding of the desires of the project	Criticism that it was just paraphrasing of New Urbanist literature. Little Innovation	High	None
Project Feasibility	Analysis provided framework which could be established within the Highland's context	Some criticism that in some ways Tornagrain is just Poundbury but with a highland theme.	High	None
	Lord Moray and Tornagrain are now featured within the Princes Foundation reports.			
Project Governance	Partnering with another developer would have caused unnecessary complications and would remove from MEDCO's design intent.		High	None
	Turnberry was vital to ensuring engagement between stakeholders and engaging with the public.			

Identified Factors	Strengths	Weaknesses	Success Rate	Reflective Improvements to FEP
Design Code	Demonstrated to stakeholders and public the commitment to the development.		High	None
	Is flexible enough to allow account for exogenous factors in future.			
Phased Delivery	Mandatory for a project of this scale		High	All though they were speculative, Phased delivery stages should have been revaluated before planning application was accepted to speed up getting to site.
	Allows for stakeholders to adjust phases according to new risks.			
Community Engagement	Early community engagement convinced locals of potential of development.		Yes	None
	Only 50 official Objections were made.			
Relations with Governance Stakeholder	Threatening THC with appeal to Scottish Government in the case planning application was not accepted quickened the application approval.	Angered a lot of councillors further THC is a long term stakeholder and project was still within its comparative infancy.	Poor	Seek consultation between THC and Scottish Council to professionally address situation before threats were even an option.
Risk Management	Majority of risks were removed as a result of competent FEP. Most Risks its table are speculative projected by author of this report.	Large delay to construction	Medium	Although the summation of largely uncontrollable factors, the risk management could have been more speculative as has been done by author of this report.
Marketing Impact	Further recognition of Tornagrain and its design intentions.	Increased cynicism towards New Urbanism	Medium	
Project Impact	Resident community are using development as expected. They in themselves create recognition of success of development.	Increase in developments which may take potential sales away from Tornagrain.	Medium	Find ways to establish Tornagrain from the other new developments.
F2.9-2.10 – Personal FEP Evaluation Tables				

2.20 Tornagrain Timeline



F2.13- Personal Diagram



2.21 Conclusion

Tornagrain is an excellent example of the New Urbanist model in as evidenced by Moray Estates Development company and its employed design team to analyse existing models, primarily Poundbury. Its feasibility was proven through front end planning and with continuous interaction with the community from conception to planning application it was ultimately favoured to succeed.

Thus far, the front end planning has proved effective, despite delays caused by recurring discussions regarding concerns about the committed costs to infrastructure with the governing body.

Prospectively, future delays could give rise to further complications which will may make it lose sight of initial values. In these circumstances, the project will come to rely heavily on the design code formulated by the front end planning to keep it on track.



(updated on 19/12/2020 with permission from tutor)

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Development Return for Phase 1A

Assumptions & Prerequisite Calculations

Less Sale Fee = **3% of Gross Development Value (GDV)**

Residential Units = **190 Units**

25% of Units are Affordable Housing = **48 Units (Shared Equity 50%)**

Profitable Residential Floor Area (**PRFA**) = 142 x 112.6^{*a} = **15,989.2m²**

Affordable Residential Floor Area (**ARFA**) = 48 x 112.6 = **5404.8m²**

Commercial Floor Area (**CFA**) = **868m²** (Calculated using AutoCAD from square area of non-residential units within Phase 1A Planning Statement)

Phase 1A Land = **29.5 Acres / 119,460m²** (Calculated using AutoCAD)

Land Value = £4271 per Acre^{*b} = **£126,076.50** (However, Land was already part of Moray Estates so cost = 0)

Selling Land Value (LV) = Began at £185 ft² (£1,991.30m²) Has risen to £215-220 ft² (£2,314.20-2,368m²)^{*c}

Therefore Average Selling Land Value (**AVL**) = **£2,179.70m²**

Construction of Infrastructure for Phase 1A = **£6,280,082^{*d}**

No construction cost of Phase 1A substructure + super structure available within public domain.

Therefore it is assumed that construction costs will value **80%** of GDV based on a desired **20%** profit.

This will be based on **AVL = £1991.3/m²** as contractors would tenure expected costs before construction:

$$\begin{aligned}
 80\% \text{ of GDV @ } £1991.3/\text{m}^2 &= 0.8 \times ((\text{RFA Total} \times \text{AVL}) + (\text{CFA} \times \text{AVL})) \\
 &= 0.8 \times (((190 \times 112.6) \times 1991.3) + (868 \times 1991.3)) \\
 &= \mathbf{£35,459,860.20}
 \end{aligned}$$

Total Phase 1A Construction costs = £6,280,082 + £35,459,860.20 = **£41,739,942.20**

^{*a}: (average of 112.6m² per home based on current A&J Stephens homes Tornagrain property stock): Stephen.co.uk. n.d. A & J Stephen Builders Ltd. [online] Available at: <https://stephen.co.uk/developments/tornagrain/> [Accessed 17 December 2020].

^{*b}: Based on Clancy, R., 2019. Farm land prices in Scotland remained resilient in 2018, with some sectors up by 4%. Property Wire, [online] Available at: <https://www.propertywire.com/news/uk/farm-land-prices-in-scotland-remained-resilient-in-2018-with-some-sectors-up-by-4/> [Accessed 17 December 2020].



Calculations

Step 1: Net Proceeds = Gross Development Value - Less Sale Fee

$$\begin{aligned}
 \text{GDV} &= (\text{CFA} \times \text{AFV}) + (\text{PRFA} \times \text{AFV}) + (0.5 \times (\text{ARFA} \times \text{AFV})) \\
 &= (868 \times 2179.79) + (15989.2 \times 2179.9) + (0.5(5405.8 \times 2179.9)) \\
 &= 1,892,153.2 + 34,854,857.1 + 5,892,051.7 \\
 &= \mathbf{£42,639,062}
 \end{aligned}$$

$$\begin{aligned}
 \text{Net Proceeds} &= 42,639,062 - (42,639,062 \times 0.03) \\
 &= 42,639,062 - 1,279,171.8 \\
 &= \mathbf{£41,359,890.1}
 \end{aligned}$$

Step 2: Profit = Net Proceeds - (Construction Costs + Cost of Land)

$$\begin{aligned}
 &= 41,359,890.1 - (41,739,942.20 + 0) \\
 &= \mathbf{-£380,052.1}
 \end{aligned}$$

Step 3: Yield% = Net Proceeds / (Construction Costs + Value of Land)

$$\begin{aligned}
 &= 41,359,890.1 / (41,739,942.20 + 126,076.50) \\
 &= 0.987 \\
 \text{Percentage} &= \mathbf{98.7\%}
 \end{aligned}$$

^{*c}: Claimed by Andrew Howard at Dorset CPRE Planning Conference 13th March 2020. Earl of Moray with Andrew Howard, Director of Moray Estates. 2020. [video] Youtube: Dorset-CPRE. [Accessed 17 December 2020].

^{*d}: Tornagrain Limited, 2019. Unaudited Financial Statements For The Year Ended 30 June 2019. [online] Saffery Champness, p.5. Available at: <https://find-and-update.company-information.service.gov.uk/company/SC336825/filing-history> [Accessed 17 December 2020].