

The Pharmacy

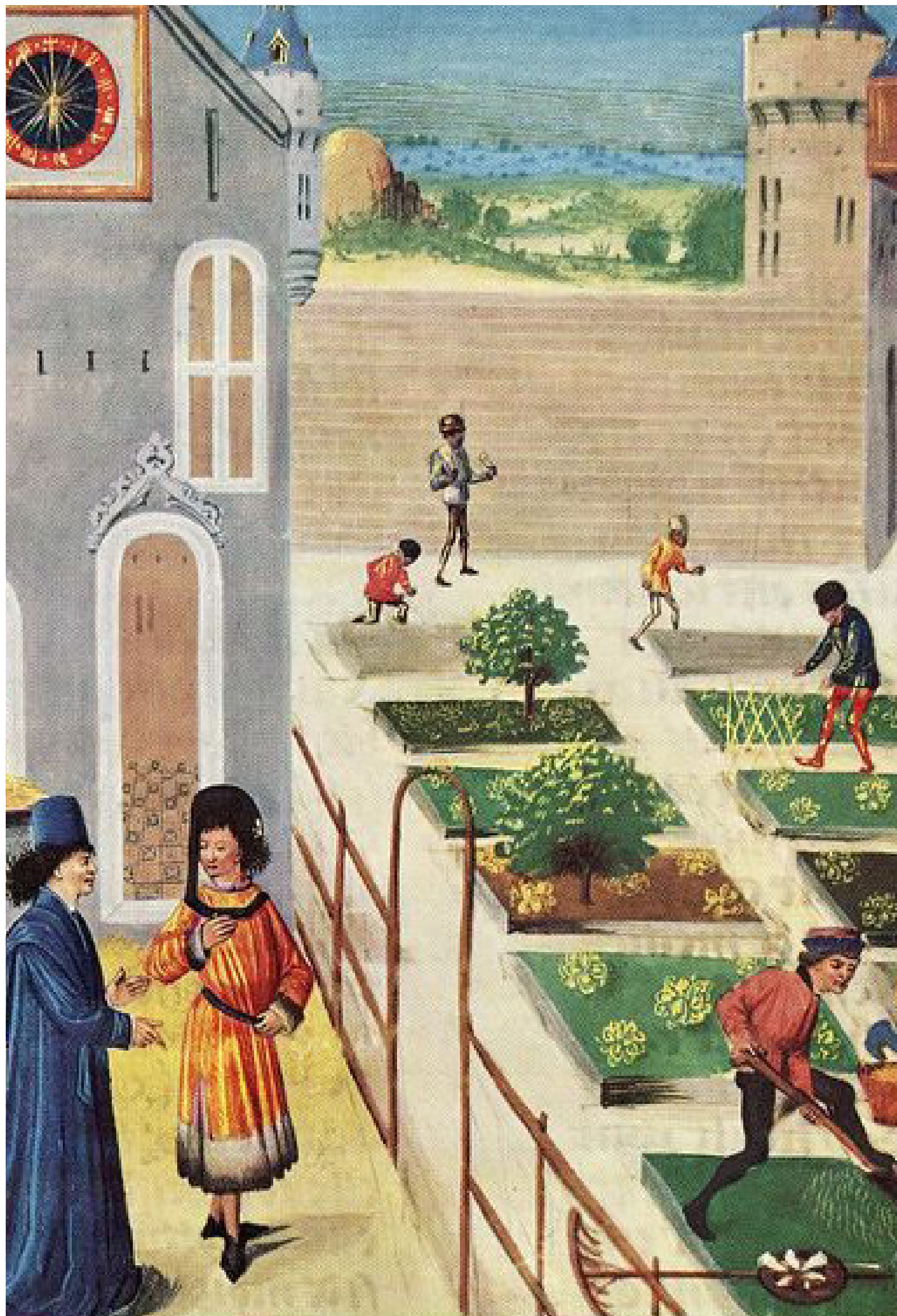


Table of Contents

3	<i>Introduction</i>
5	<i>The Highway and the Country</i> Context Thematic
20	<i>Site</i> Information Drawings Photographs
32	<i>Discourse</i> Precedent Studies Visualized Evidence Architectural References
60	<i>Project</i> Description Outcomes and Deliverables
72	<i>Expert Interview</i>
74	<i>Bibliography</i>
76	<i>Afterword</i> Reflection: Project in Relation to Discourse

Introduction

A new Irish pharmaceutical production type that provides an alternative to the existing facilities in a changing Irish pharmaceutical landscape, while at the same time generating a new working environment that improves the wellbeing of its users.

This project explores the realities of production in the Irish landscape, and speculates upon certain industries that maintain both a rural economy and Ireland's architectural identity. The Farmacy, houses a pharmaceutical production facility within the traditional scale of the smallholding or farm, while using the authentic spatial model of the abbey. It provides an alternative to the existing fragmented pharmaceutical production landscape. In its density, scale, repeatability and seriality it continues to define an architecture of rural Ireland, while they also give a much-needed identity to an economically important emerging industry.

The pharmaceutical industry is the most valuable sector in the economy of Ireland with 8 of the Top 10 pharmaceutical companies located in the country¹. Over 55 production sites are in the country with a value of \$ 38.2 billion. Pharmaceuticals are also Ireland's number one export. One could even say that Ireland has a tradition of producing Health in the Irish landscape. In the 10th en 11th century, many monasteries were founded and different Abbeys were built by local chieftains and lords.² One of the main futures of the design of the abbey and monastery is the cloister garden. The cloister garden was the heart of the abbey and used to grow flowers, herbs and other plants with healing purposes.

The Farmacy builds upon the rich tradition of production in the Irish rural landscape, while also reinterpreted the spatial model of the Abbey, which can be described as the first architectural type for pharmaceutical production. The hybridization of these types uses the cloister garden as a symbolic spatial feature the represents a new form of wellness. Wellness in the form of a garden with traditional plants that can grow in Ireland and have a health-giving property. It generates pleasant views for its employees, attractive spaces to stay for its surroundings, the community and during a lunchbreak.



Yuanpeng Zhang, *The Highway and the Country*, 2018

The Highway and the Country

In taking Ireland as a starting point to Ireland—an island in the Northern Atlantic Ocean—is separated from Great Britain by the Irish Sea, whose upper half is also a part of the United Kingdom. Located on the edge of Europe, Ireland has been largely peripheral to the continent's history at least through its industrialization and economic success. However, in purely cartographic terms, the island can be considered the center of the world. If one were to locate a pin in the middle of a world map, it would most likely land at Ireland. The Republic and Northern Ireland are separated by a border—the result of sectarian conflict—dividing the minority of the north from the majority of the south. If the border is de facto invisible due to the British membership of the European Union, the plausible new reality of a “Hard Brexit” questions the necessary relationship between the two parts of this island.

The country's population achieved its numerical maximum of eight million inhabitants in the nineteenth century; however, since then, the country has been unable to recover from such demographic strength. The Great Potato Famine of 1845—which claimed the starvation of one million people and resulted in three million emigrating abroad—can be considered as the beginning of a trajectory of steady population loss. Two centuries later, Ireland's current population consists of merely six million inhabitants. The distribution of its population is unequal across the island with up to 60% of the population concentrated in the urban centers of the east, most notably Dublin and Belfast. Consequently, these cities have attract-ed multinational companies like Google, Facebook, and Apple, contributing to highly developed eastern and southern parts of the country—operating in a stark contrast to the west which remains rural and depopulated. In this regard, the small island is divided from north to south by political and religious differences, and from east to west by economic and demographic disparity.

To mediate these divisions, the Government of the Republic of Ireland has proposed the construction of an “Atlantic Corridor,” a series of highways running from north to south along the western region of the island, aimed at stimulating economic growth. Furthermore, the Republic's Project Ireland 2040 National Planning

Framework, directed towards a future date of 2040, anticipates an influx of one million non-Irish migrants. Approached as an opportunity to redistribute both population and development across the island, both proposals allude to the possibility of a permanent economic route through Derry/Londonderry, thereby establishing a new set of relationships between Ireland and Northern Ireland. By imagining a new north-south link, both plans effectively seek to establish a new relationship between the east and west of the island. Although the Project Ireland 2040 National Planning Framework anticipates a widespread transformation, it lacks a clear articulation of a spatial agenda for these changes. While the Atlantic Corridor is a clearly delineated construct spanning 430 kilometers, its effect on the country remains uncharted.

One of the island's peculiarities is that the Republican South extends further north than the Unionist North. This uppermost region, both north and south, Irish and British, more than any other region in Ireland will concentrate the effect of Ireland's future redevelopment plans. This significant terrain, known as County Donegal, is where this collection of eleven projects is sited. Located between the towns of Sligo in the south and Derry/Londonderry in the north, it is one of the most economically fragile counties of the Republic. This fragility is further highlighted by its geographic position, surrounded on either side by the sea and Northern Ireland, and connected to the Republic by a narrow strip of land that makes it susceptible to the effects of a possible hard border with Brexit.

Characterized by pastures, woodlands, small villages, peat fields, and a dispersal of innumerable one-off houses, the remote County Donegal is exemplar of the coexistence between rural countryside, housing estates, and urbanized towns in Ireland.³ These settlements represent the architecture of the region; and yet historically this region has existed without any real relationship to the profession or the culture of architecture.

The following architectural project is one of eleven that speculates on County Donegal's possible architectural futures in relation to the Project Ireland 2040 National Planning Framework, the construction of the Atlantic Corridor, and the indeterminacy of Brexit—creating necessary encounters between north and south, between infrastructure and environment—or in short, between the highway and the country.



As Found Photograph Farming

Ramon Scharff, photograph of farming
settlement Donegal, May 2018



As Found Photograph Pharmaceutical Industry

Pfizer, Grange Castle Aerial, June 2006



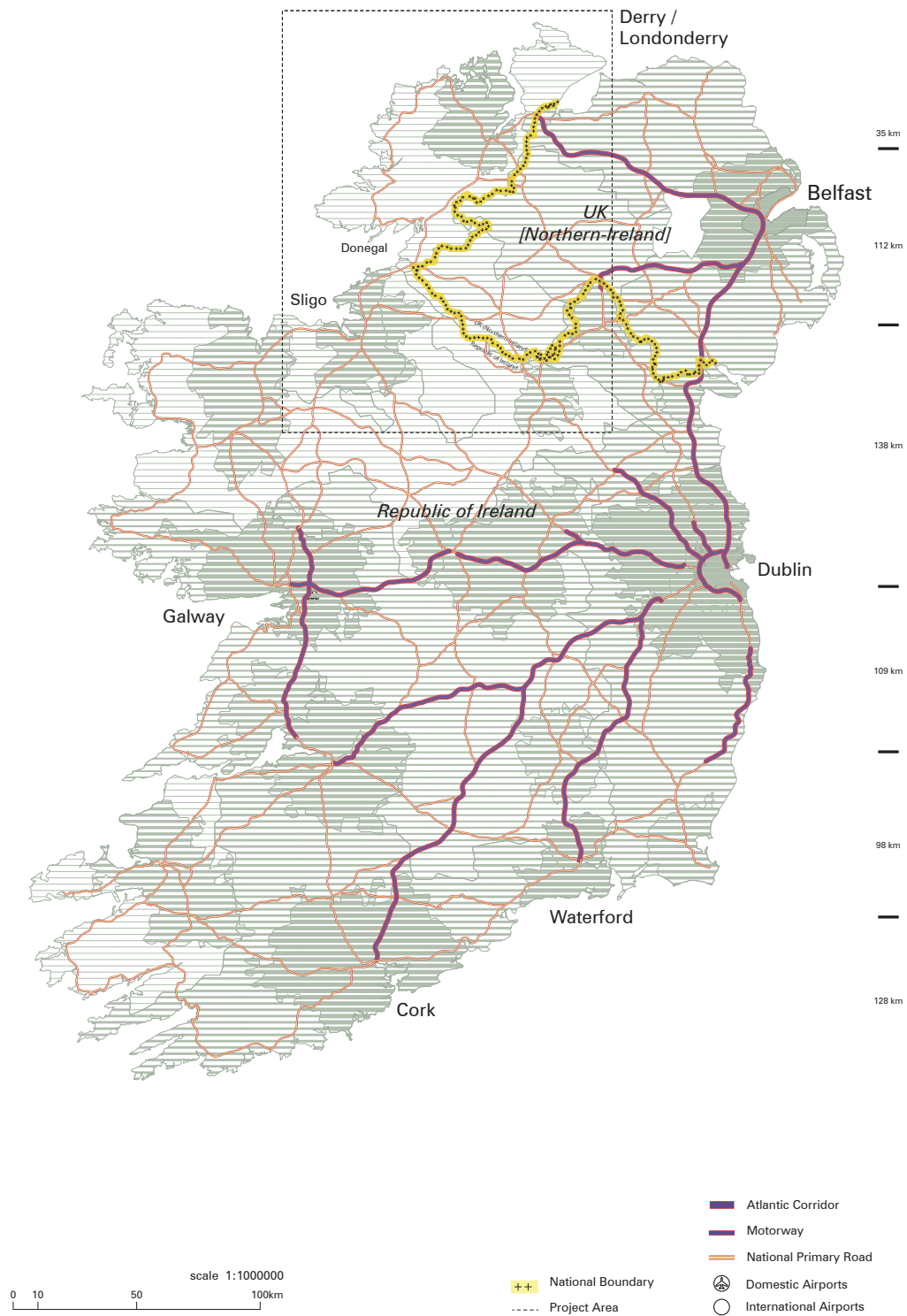
Map of Road Network in Ireland 2018

Berlage Generation 28, Data from
National Planning Framework, May 2018



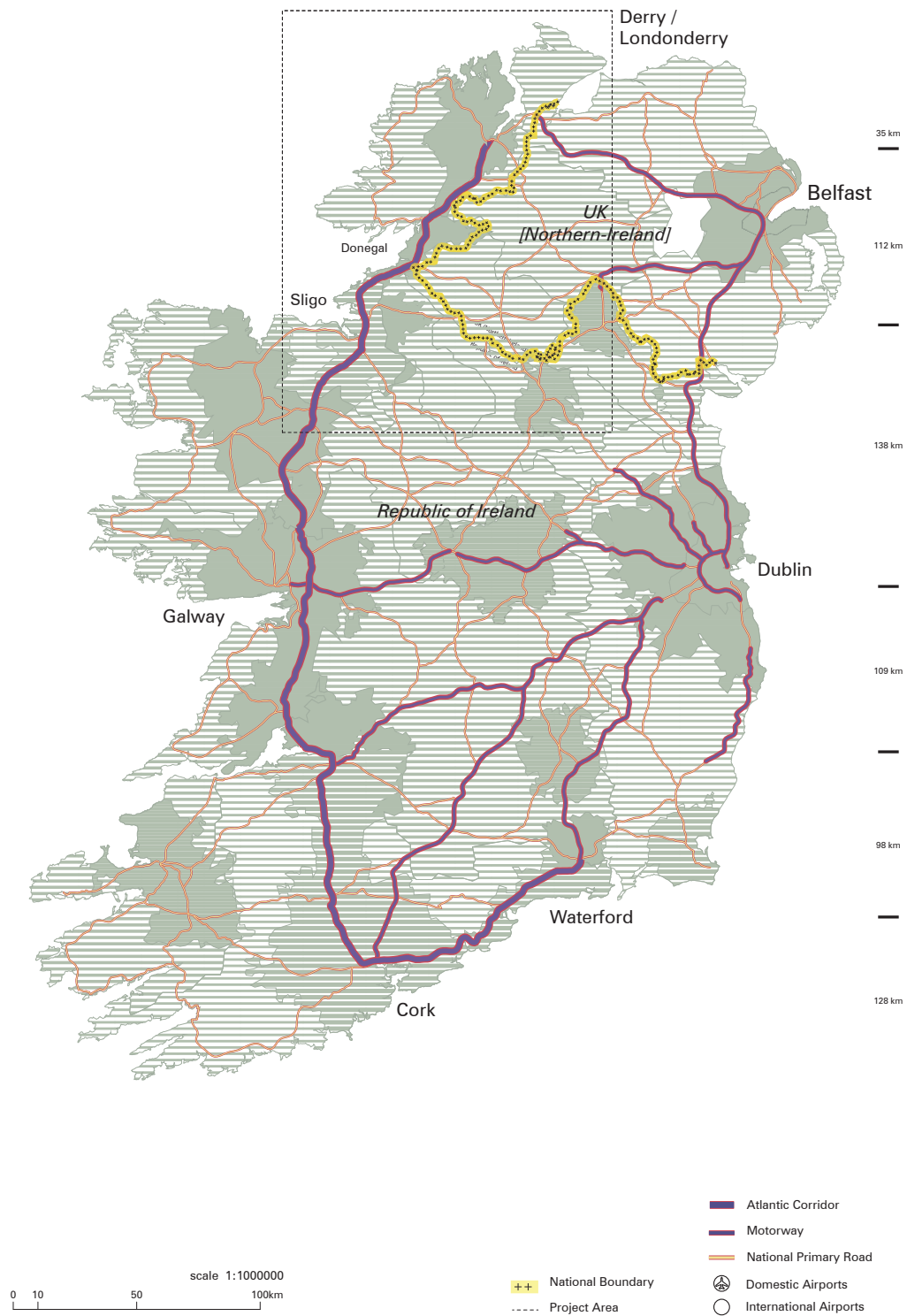
Map of Road Network in Ireland 2040

Berlage Generation 28, Data from
National Planning Framework, May 2018



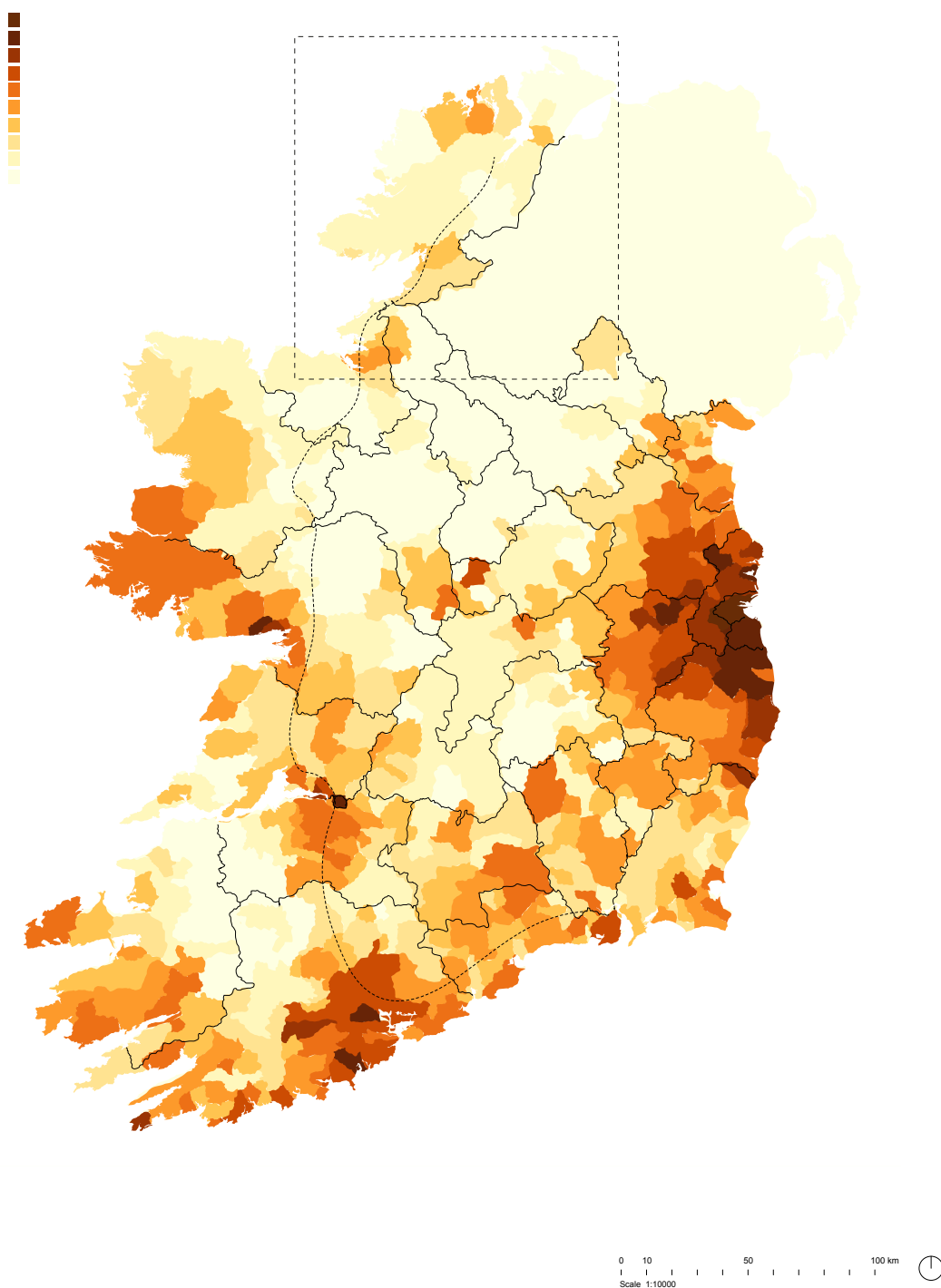
Map of Economical Acitivity 2018

Berlage Generation 28, Data from
National Planning Framework, May 2018



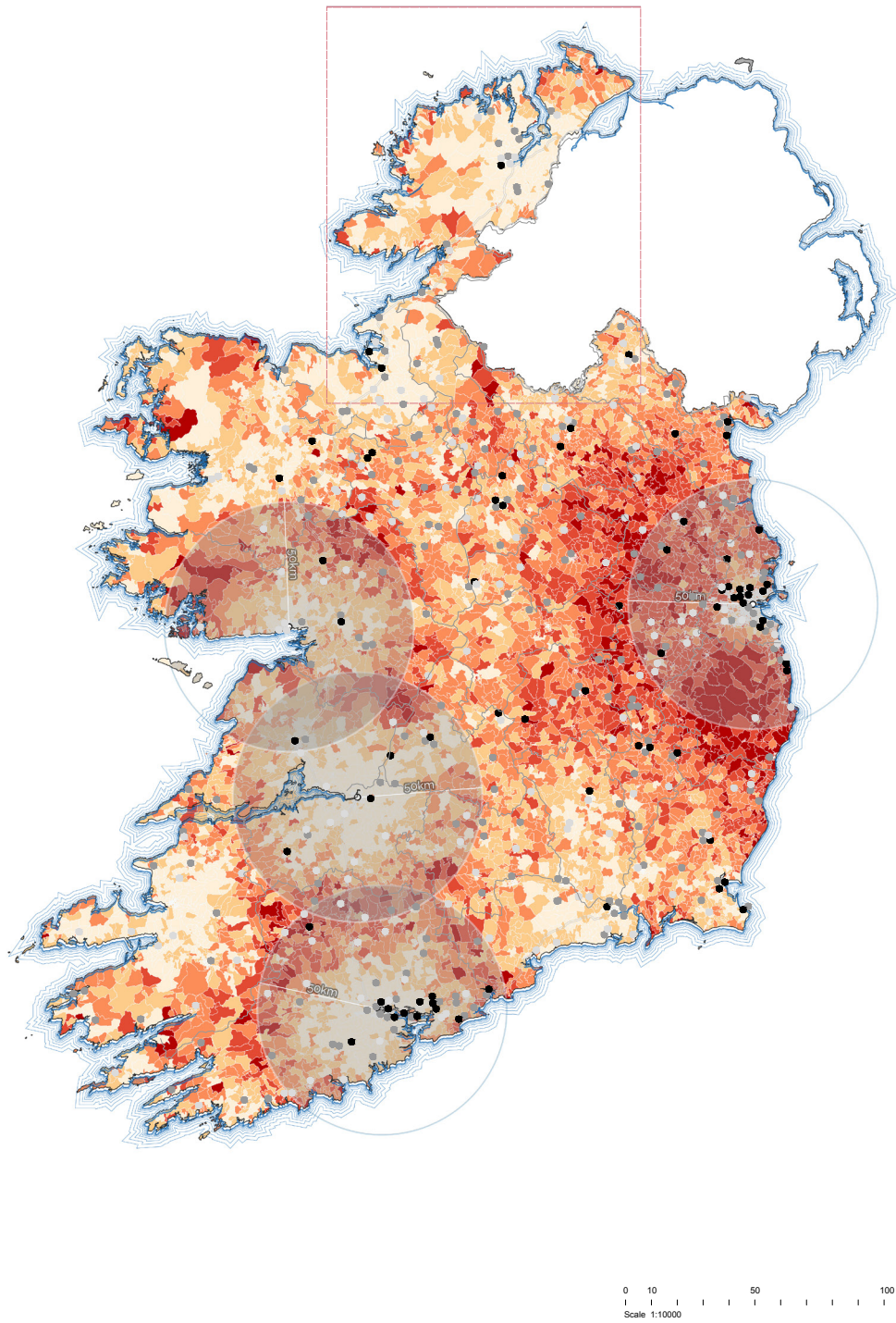
Map of Economical Activity 2040

Berlage Generation 28, Data from
National Planning Framework, May 2018



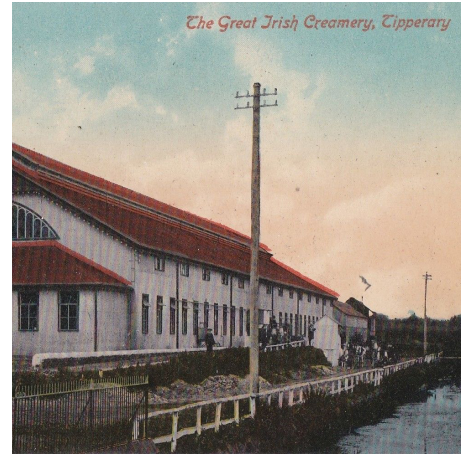
Map of Land Value Ireland

Berlage Generation 28, Data from
National Planning Framework, May
2018



Map of Commuters Destinations

Berlage Generation 28, Data from
National Planning Framework, May
2018



Production in Ireland; Mining, Farming, Creameries, Breweries, Distribution, Pharmaceutical Industry.

Images from the Rural Atlas of Ireland



Economy and Labour



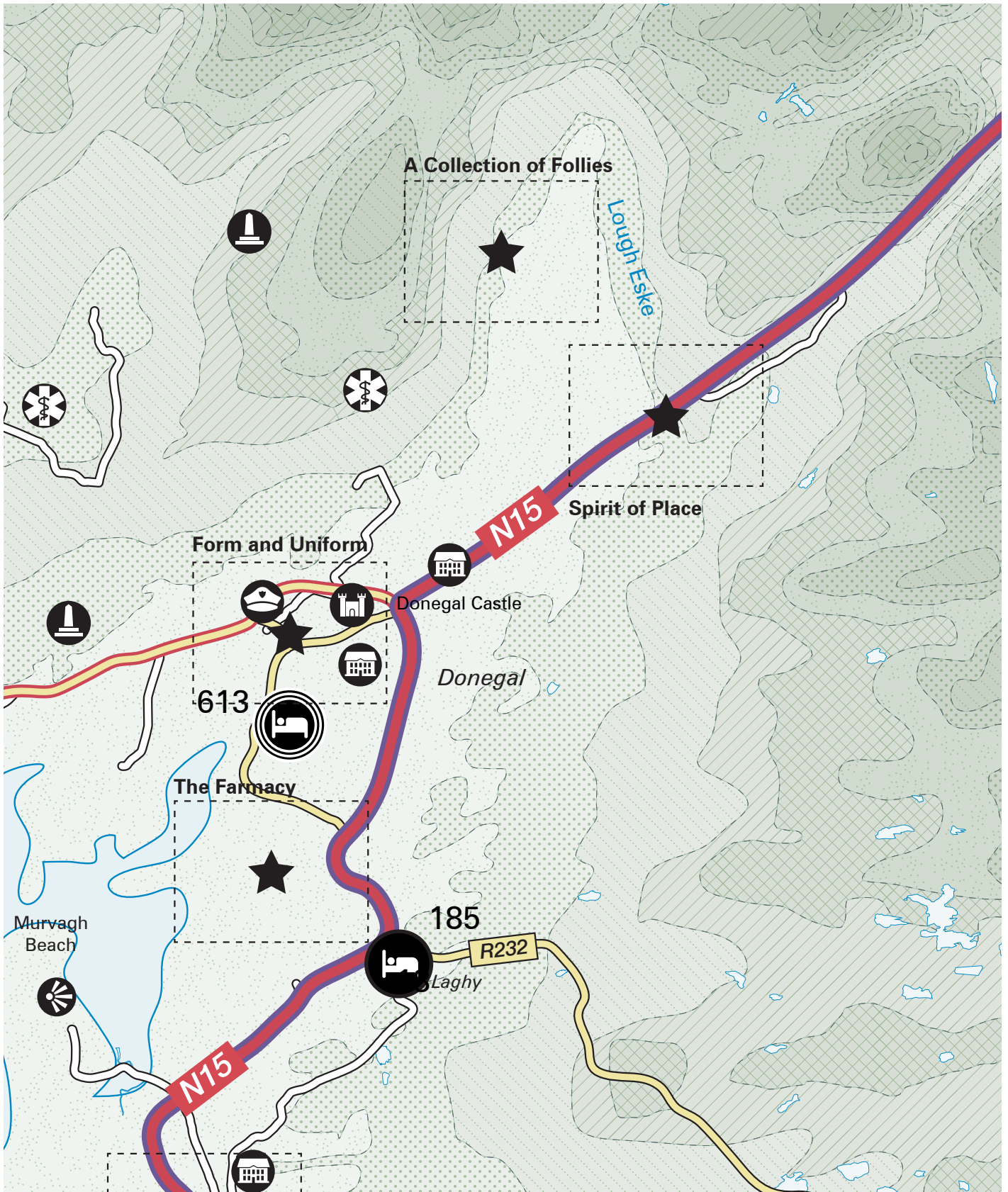
Map of Donegal, Economy and Labour

Berlage Generation 28, Data from
Sense Ireland, May 2018



Collective Site, County Donegal

Berlage Generation 28, Data from
Sense Ireland, May 2018



Location of the Project, Laghy

Berlage Generation 28, Data from
Sense Ireland, May 2018



Ruin of a Monastery in Sligo



The Pharmaceutical Garden, Hortus
Conclusus



As found Photograph Farming
Settlement

Ramon Scharff, photograph of farming
settlement Donegal, May 2018

Site

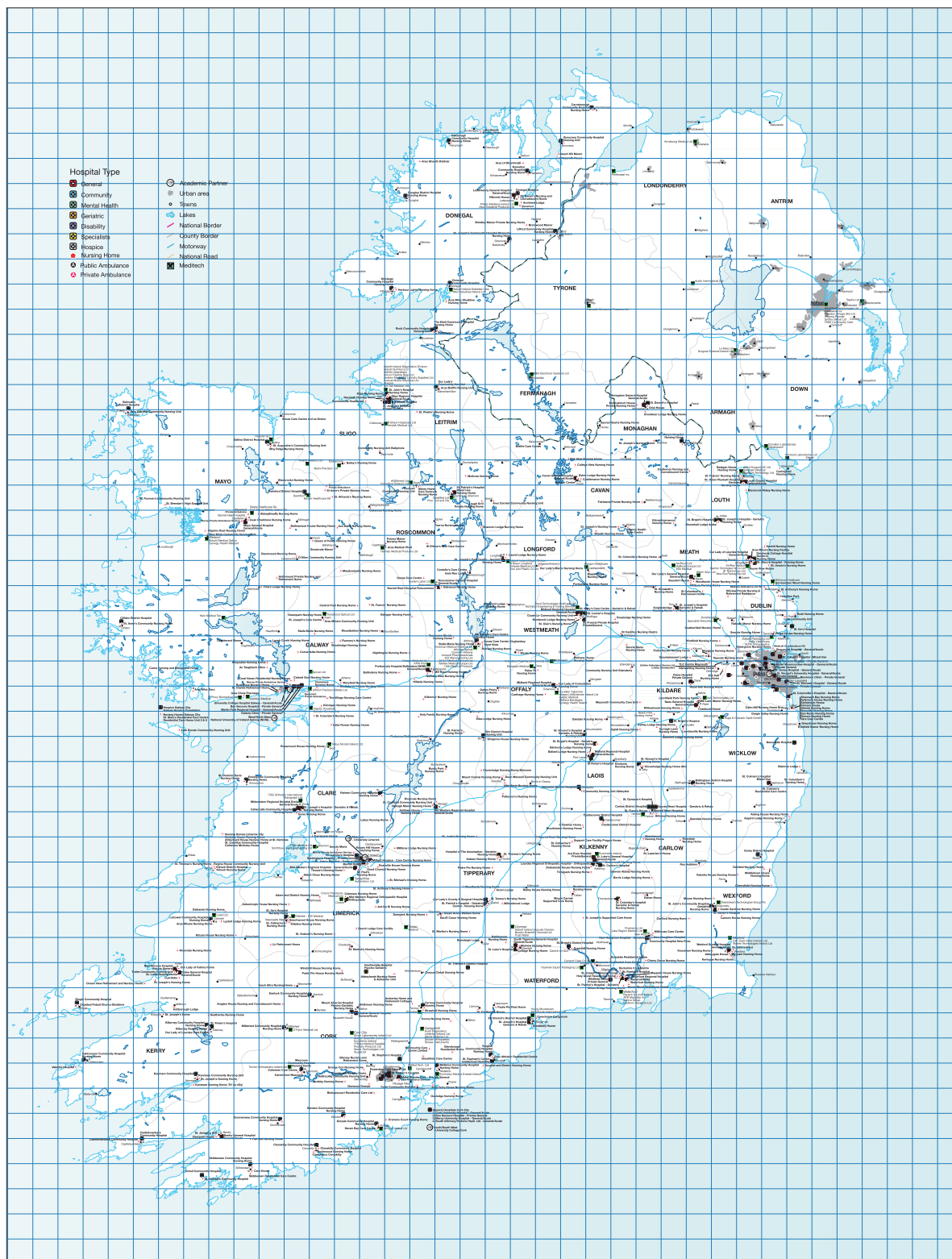
Pastures and Production

Balanced development for Ireland through National Planning Framework 2040 calls for a sustainable process that is different from that of single majority centered development happening at present. National highway piercing through the west coast of Ireland from south to north, named the Atlantic corridor, is developed with aim to service as a vein to facilitate flow to goods and people to vitalize the region. How this project will affect the rural landscape is unclear. Agricultural practice is on decline in rural parts of Ireland, seeing persistent loss of population to bigger towns. This is especially distinct in town of Donegal on west of Ireland, where number of farms decreased by 68% between 1951 and 2010, third in the percentage change and the highest in number of farm loss in Ireland. The highway could, as intended, bring growth and populate the area, or accelerate this loss of farms and people. In either scenario, rural housing settlements are faced with a forthcoming change alien to the present scene, without a proper consideration or a plan laid out. This is already a phenomenon chronic in Dublin, where surrounding farming towns are turned into bed-towns with residents commuting average 50 minutes to work from outside the town. The distance travelled and time spent is on constant rise, a quarter of the workers commuting from outside the city and suburbs. The north western Ireland sees considerable cross-border commute, houses empty during the day, and blight of unoccupied one-off housing estates. There is an unsustainable loss of connection to the place.

The projects situate this current aim and reality, and the idea for new spatial forms of manufacture facilities via design proposals of new productive spaces in this largely agrarian and domestic Donegal countryside. A productive space is rooted in its smaller context in site, labor, domestic market, and on a larger context, relates to international supplies, logistics, non-domestic markets. This varying scale of network, within which a productive space located in the countryside operates, reflects the larger context that links the specific place where the space is located to its larger surroundings. The productive space needs spatial strategies to market it as being associated to a distinct place, while still playing between the smaller and wider contexts.

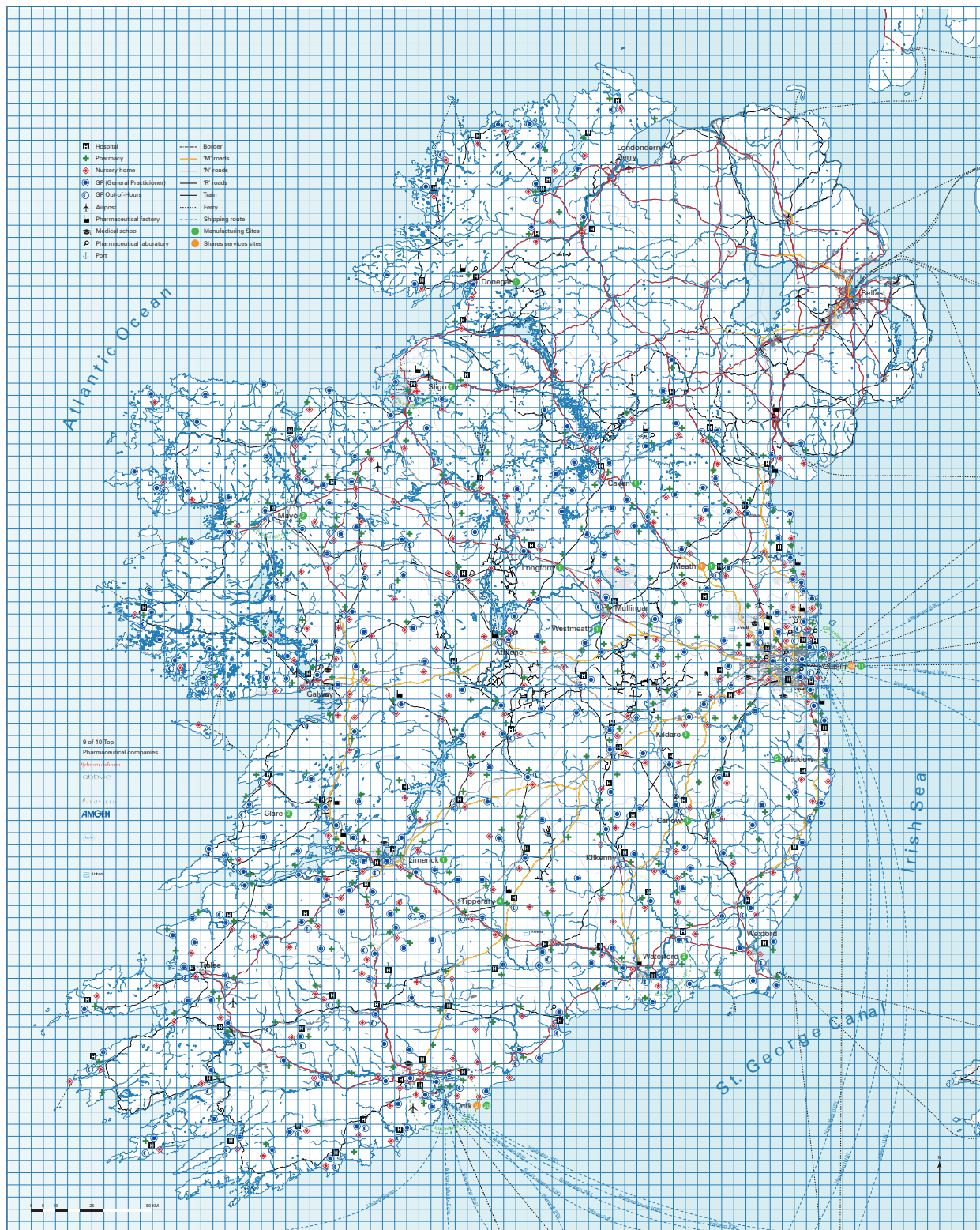
The systematic productivity in the countryside can be referenced from the old farming practice in arid lands of west Ireland, the Rundale. It is a collective farming system where the farmers would form a cluster, taking turns to farm potato or oats on different parts of the field, throughout the year. This was to ensure equality in farming the harsh mixture of bog, sand, stony and good pieces of land that west Ireland presented. An area immediately around the houses would be used for domestic purposes- farming other vegetables, to keep cattle whose waste, along with peat, was an important fertilizer for the crop. The present land division in the rural derives much from this practice.

Taking a productive architecture as the vehicle, the projects examine what role architecture can play in place differentiation and future development of the Irish countryside, in its tension between the local and global relations.



Map of Medical infrastructure Ireland

Ramon Scharff, Data from Central Statistics Office, May 2018



Map of Pharmaceutical Landscape
Ireland

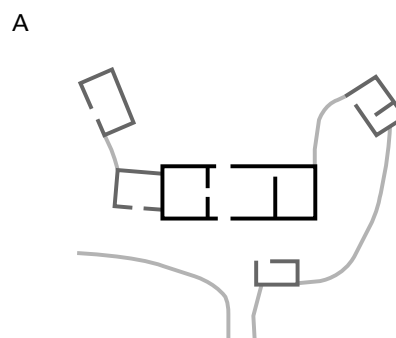
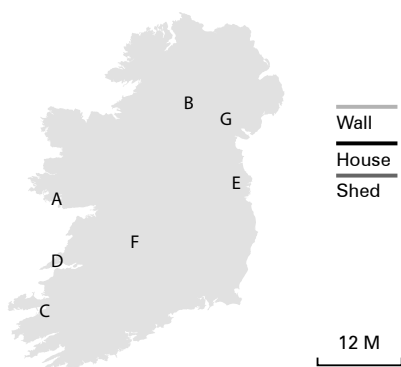
Ramon Scharff, Data from Central
Statistics Office, May 2018

Top 10 - Export Ireland

1. Pharmaceuticals:	\$38.2 billion	(28.3%)
2. Organic chemicals:	\$23.8 billion	(17.7%)
3. Optical, technical, medical apparatus:	\$13.8 billion	(10.2%)
4. Electrical machinery, equipment:	\$9.0 billion	(6.7%)
5. Perfumes, cosmetics:	\$8.4 billion	(6.2%)
6. Machinery including computers:	\$7.4 billion	(5.5%)
7. Aircraft, spacecraft:	\$4.8 billion	(3.5%)
8. Other chemical goods:	\$3.7 billion	(2.8%)
9. Meat:	\$3.5 billion	(2.6%)
10. Dairy, eggs, honey:	\$2.7 billion	(2%)

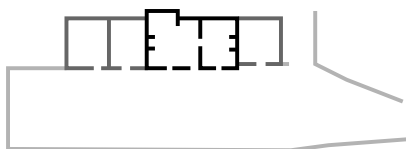
Top 10 - Import Ireland

1. Aircraft, spacecraft:	\$14.7 billion	(17.4%)
2. Pharmaceuticals:	\$10.2 billion	(12.1%)
3. Machinery including computers:	\$7.9 billion	(9.4%)
4. Mineral fuels including oil:	\$5.3 billion	(6.2%)
5. Electrical machinery, equipment:	\$5 billion	(6.0%)
6. Organic chemicals:	\$4.1 billion	(4.9%)
7. Vehicles :	\$4.1 billion	(4.9%)
8. Plastics, plastic articles:	\$2.8 billion	(3.3%)
9. Optical, technical, medical apparatus:	\$2.6 billion	(3.1%)
10. Perfumes, cosmetics:	\$1.3 billion	(1.5%)



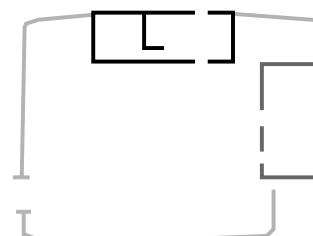
A) Irregular farmyard with scattered buildings at Gorumna, county Galway.

B



B) Outhouses extended along long axis of dwelling at Glenhull, county Tyrone.

D

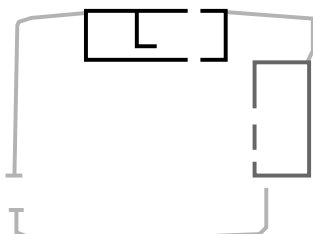


D) Half courtyard with buildings along two sides of a rectangular yard at Kilbaha, county Clare.

Spatial Configuration of farms

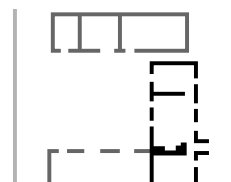
Redrawing from the Rural Atlas of Ireland.

D



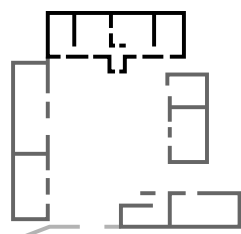
D) Half courtyard with buildings along two sides of a rectangular yard at Kilbaha, county Clare.

E



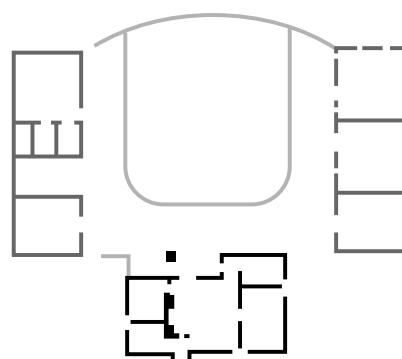
E) Buildings along three sides of a rectangular yard at Drishoge, county Dublin.

F



F) Buildings forming an almost completely enclosed yard at Castle Otway, near Templederry, county Tipperary.

G

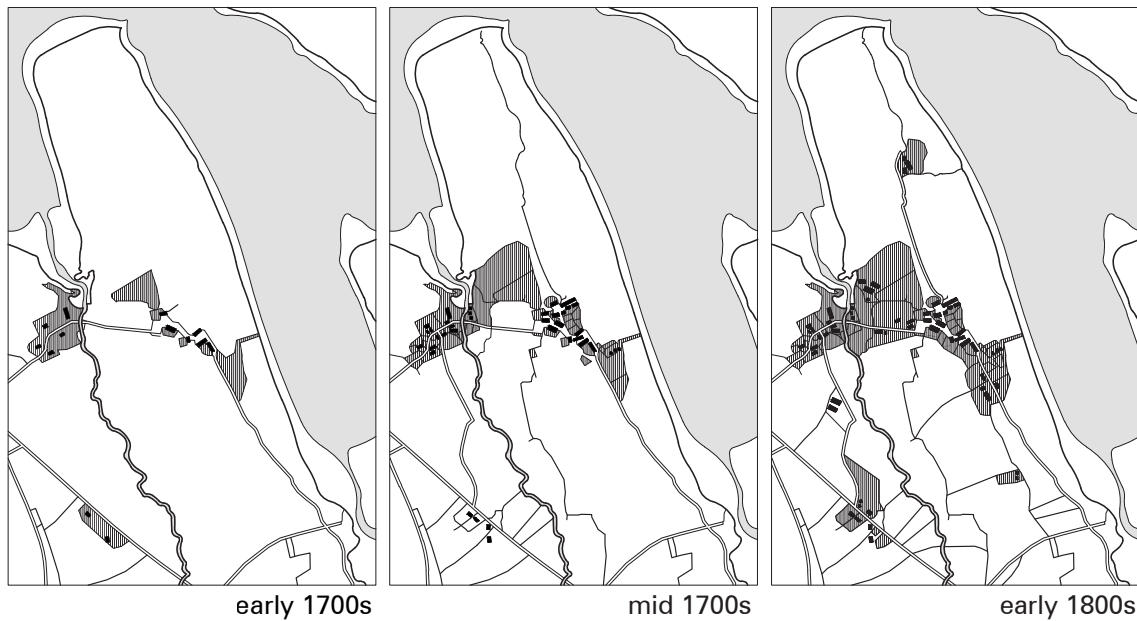


G) 'Improved' farm lay-out, 1820 on the Gosford and Drumbanagher estates, county Armagh. The house is detached with its front entrance away from the yard.

Spatial Configuration of farms

Redrawing from the Rural Atlas of Ireland.

RUNDALE SYSTEM



SITE: DEVLINAGH, DONEGAL COUNTY

SITE: DEVLINAGH, DONEGAL COUNTY
200M 1KM

Rundale Farming System

Redrawing from the Rural Atlas of
Ireland.



SITE: DEVLINAGH, DONEGAL COUNTY

200M 1KM

Rundale Farming System

Redrawing from the Rural Atlas of
Ireland.



Site Photograph Laghy

Ramon Scharff, photograph of project
site, Laghy, Donegal, May 2018



Project Site, Laghy, County Donegal

Satellite Image from Google Earth

Discourse

Production in the Irish Landscape
Public buildings churches, schools, halls, shops, pubs, creameries, factories, farm outhouses are among the most visible aspects of the Irish rural landscape. These remain vital in sustaining the economy, services, social life and the practical daily functioning of the countryside. They form the hubs of small villages and they are also the oldest structures, creating a sense of continuity and depth.

Understanding how, when and where these various building types emerged is essential to interpreting the beating heart of the rural landscape. The large farm in southern and eastern Ireland, with its traditional emphasis on mixed farming, needed a variety of buildings for its activities. Farm buildings are frequently grouped around a rectangular yard, with one side formed by the dwelling house. Many farms, especially the smaller ones, do not exhibit any distinctive lay-out of buildings.

In the north and west of the country, the older farmsteads commonly constitute a single long range of buildings, with house, stable and byre joined together. Sometimes on the poorest farms, the house stands alone without paddock or garden and is accompanied by only a small crude storehouse. The limited expression of outbuildings on western farms is linked to the pastoral traditions and mild climate but it also reflects long standing use of compact long-houses, accommodating animals and humans under one roof. Detached, functionally-specialised buildings have only appeared with the collapse of the long-house tradition. On many of the older farmsteads in south-western Ireland, the house faces the outbuildings and is separated from them by a laneway (the 'street'), which connects to the public road.

Barns and other traditional outbuildings on Irish farms are never impressive structures. They lack even elementary ornamentation and they do not exhibit building techniques of any great antiquity. Characteristically, farmers erected only the most functional of outbuildings. Like the farmhouses, these are rectangular in plan and built with either stone or mud. The spare simplicity and frankness of agricultural buildings in Ireland and their use of local building materials connects them naturally to the land, and farmsteads form pleasing assemblages which nestle comfortably into the landscape.

With the wholesale modernization of agriculture in recent decades, many new farm buildings have been erected, especially in richer eastern areas, disrupting traditional patterns of farm lay-out. There is a tendency towards looser, free-standing and generally linear arrangements of farm buildings, consistent with increased use of tractors and bulky machinery. The erection of slatted sheds, silage pits and large metal barns to provide winter shelter for cattle and crop storage has been widespread in recent decades. These bigger structures are usually detached from and dominate the older ranges of buildings. Farm amalgamation in areas of rural depopulation has led to abandonment or partial use of many farmsteads. These frequently become unsightly cattle yards and silage stores, with wrecked buildings, rusting machinery and decaying vehicles.

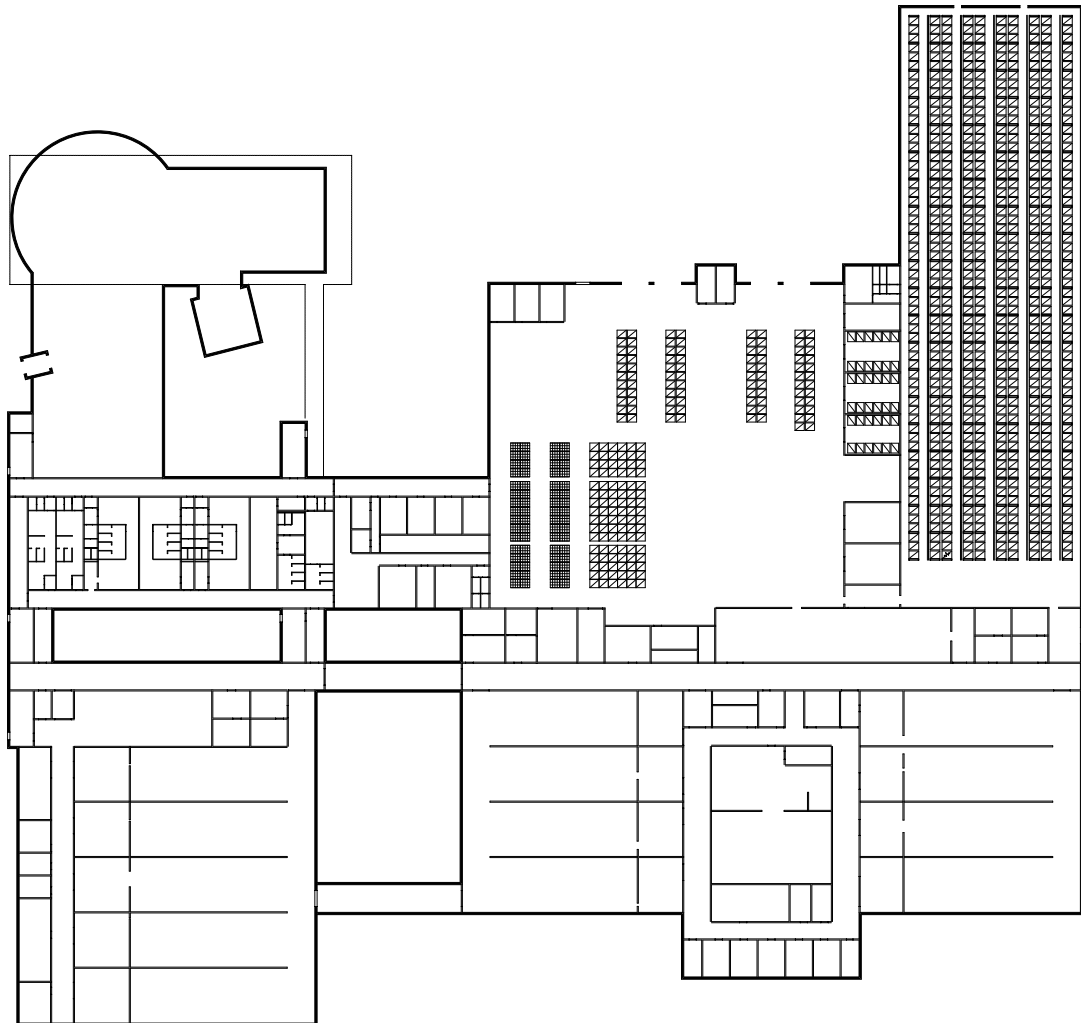
Precedent Studies

When considering the contemporary Irish landscape one could find another present type of production facility that is carefully embedded in the landscape, the pharmaceutical factory. The pharmaceutical industry and its related program is spatially embedded in the Irish landscape. Different building types locate themselves on specific sites, in the town and in the country, per the provision of physical and non-physical infrastructure, the presence or absence of population centers. Corporate offices in big cities, of which Ireland only has two, Dublin and Cork, distribution centers around big settlements, and noxious chemical factories away from the inhabited areas. Factories with the same uniform language around the world. Functional and pragmatic spaces, square and anonymous boxes that support their goal, efficiency.

This anonymous and global architectural language has not always been like that in the Irish landscape. One could say that Ireland has a tradition of producing Health in the Irish landscape. Ireland was known as the Island of saints and scholars after the Island was converted to Catholicism by Saint Patrick. In the 10th and 11th century, many monasteries were founded and different Abbeys were built by local chieftains and lords. The monks where most of their time writing manuscripts and books.

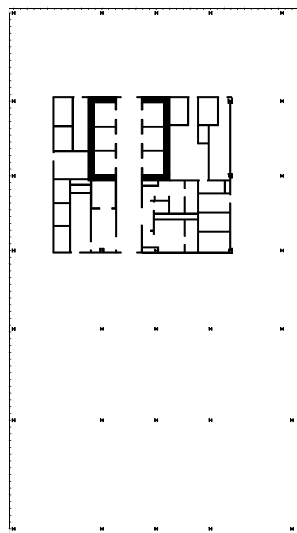
One of the main futures of the design of the abbey and monastery is the cloister garden. The cloister garden was the heart of the abbey and used to grow flowers, herbs and other plants. The first signs of pharmaceutical production, since the citizens went to their nearest abbey to get cured in case of sickness.

The monasteries and abbeys where constructed of local materials and located just outside the settlements.

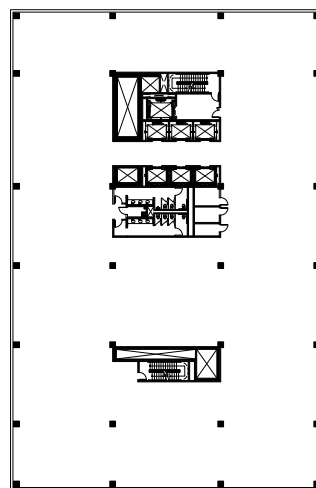


5. Pill Packaging

Pill Packaging Factory, Cork, Ireland
Scale 1:500



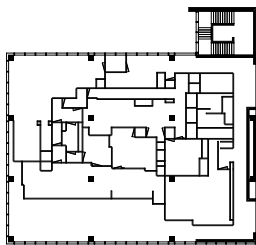
1. Laboratory



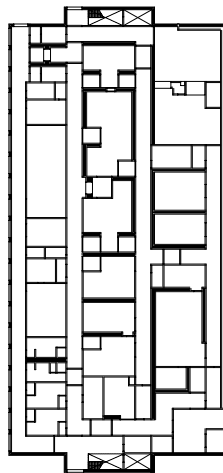
2. Office

Laboratory, Dublin, Ireland
Scale 1:500

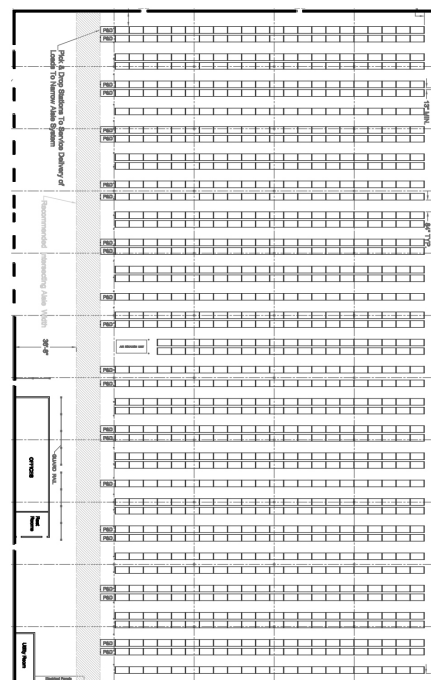
Office, Dublin, Ireland
Scale 1:500



4. Pill assembling



3. API Production

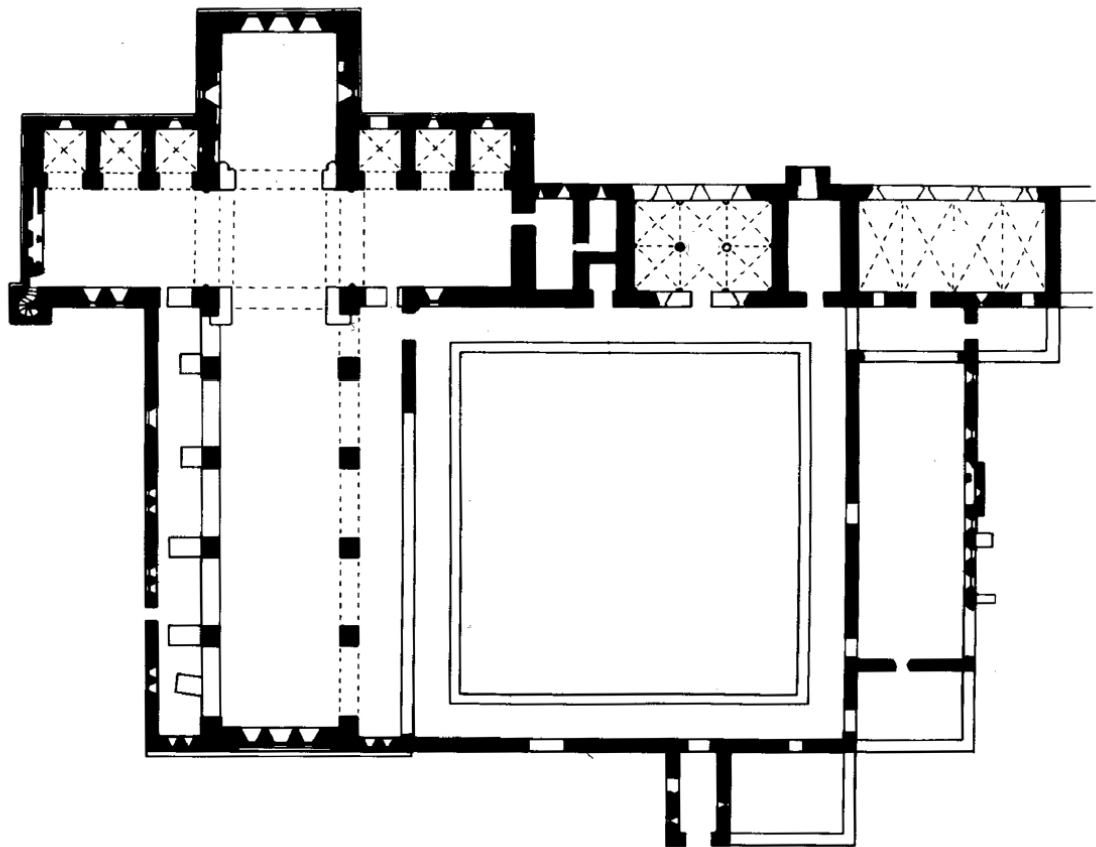


6. Storage / Distribution

Pill Assembly, Sligo, Ireland
Scale 1:500

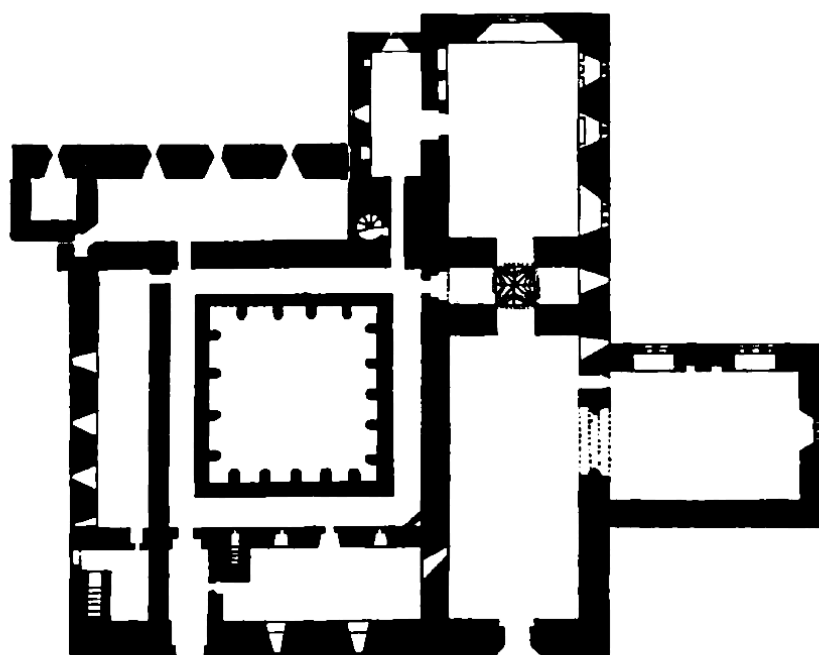
API Production, Mayo, Ireland
Scale 1:500

Storage / Distribution, Limerick, Ireland
Scale :500



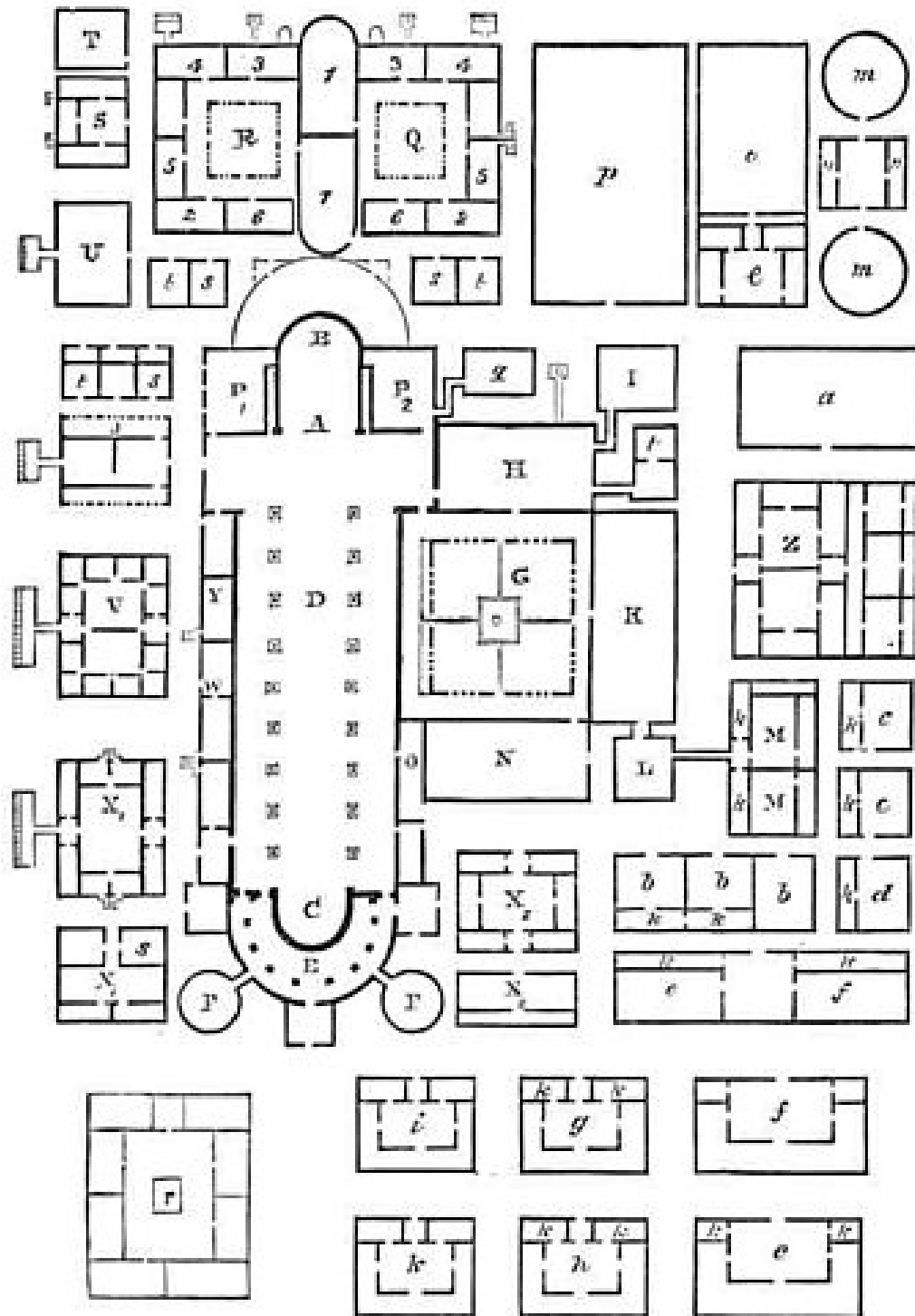
Dunbrody Abbey, County Wexford,
Ireland

Scale 1:350



Muckross Abbey, County Kerry, Ireland

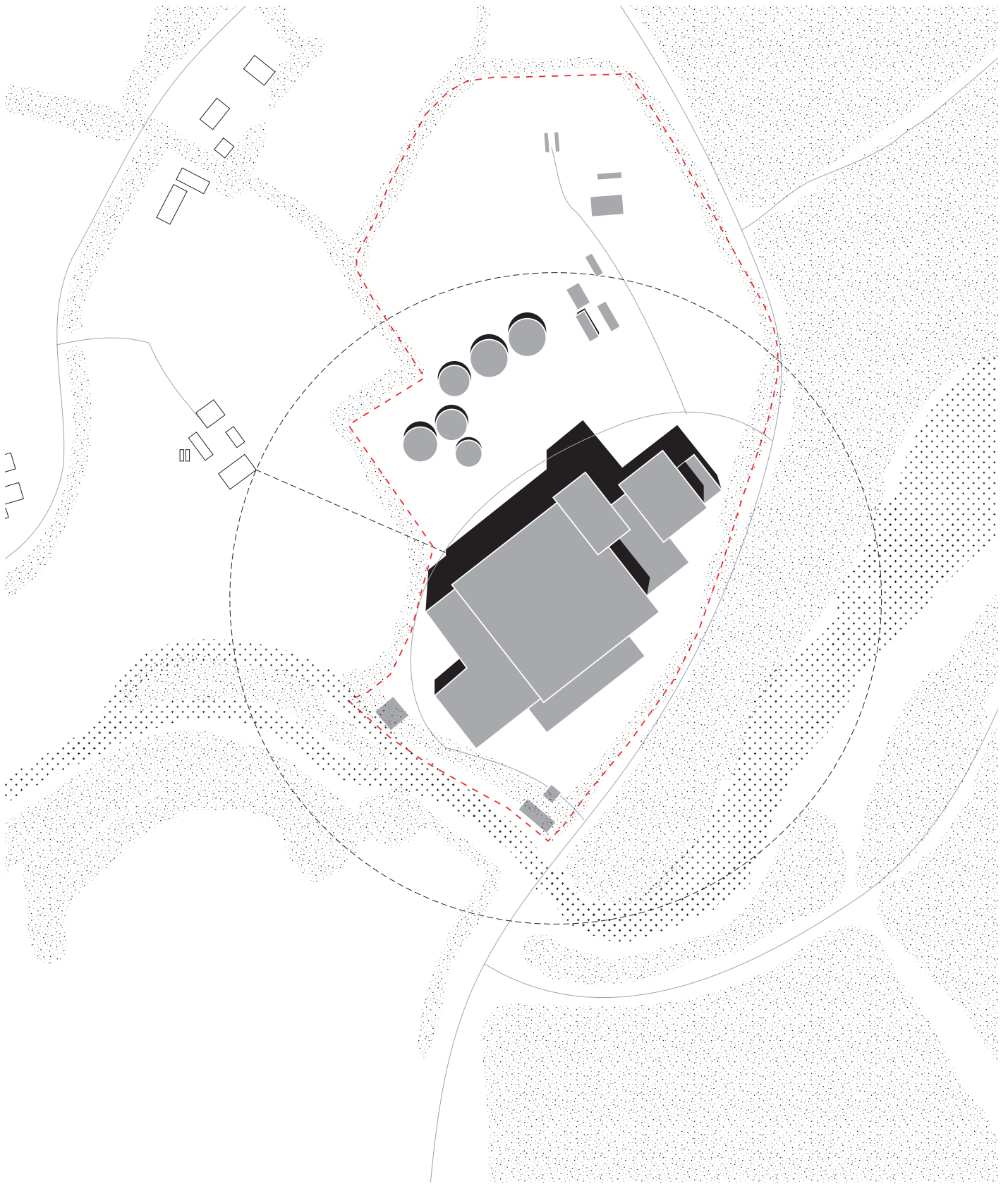
Scale 1:350



Plan of Saint Gall, Saint Gall Monastery,
9th Century



Common Color and shapes of pills,
Shanghai Penglai, 2016



Presedence site drawing of
Pharmaceutical production facility
(diabetics) in Donegal, Ireland



Satellite Images, Pharmaceutical production facilities Ireland, Google Earth, July 2018

With the wholesale modernization of agriculture in recent decades, many new farm buildings have been erected, especially in richer eastern areas, disrupting traditional patterns of farm lay-out. There is a tendency towards looser, free-standing and generally linear arrangements of farm buildings, consistent with increased use of tractors and bulky machinery. The erection of slatted sheds, silage pits and large metal barns to provide winter shelter for cattle and crop storage has been widespread in recent decades. These bigger structures are usually detached from and dominate the older ranges of buildings. Farm amalgamation in areas of rural depopulation has led to abandonment or partial use of many farmsteads. These frequently become unsightly cattle yards and silage stores, with wrecked buildings, rusting machinery and decaying vehicles.

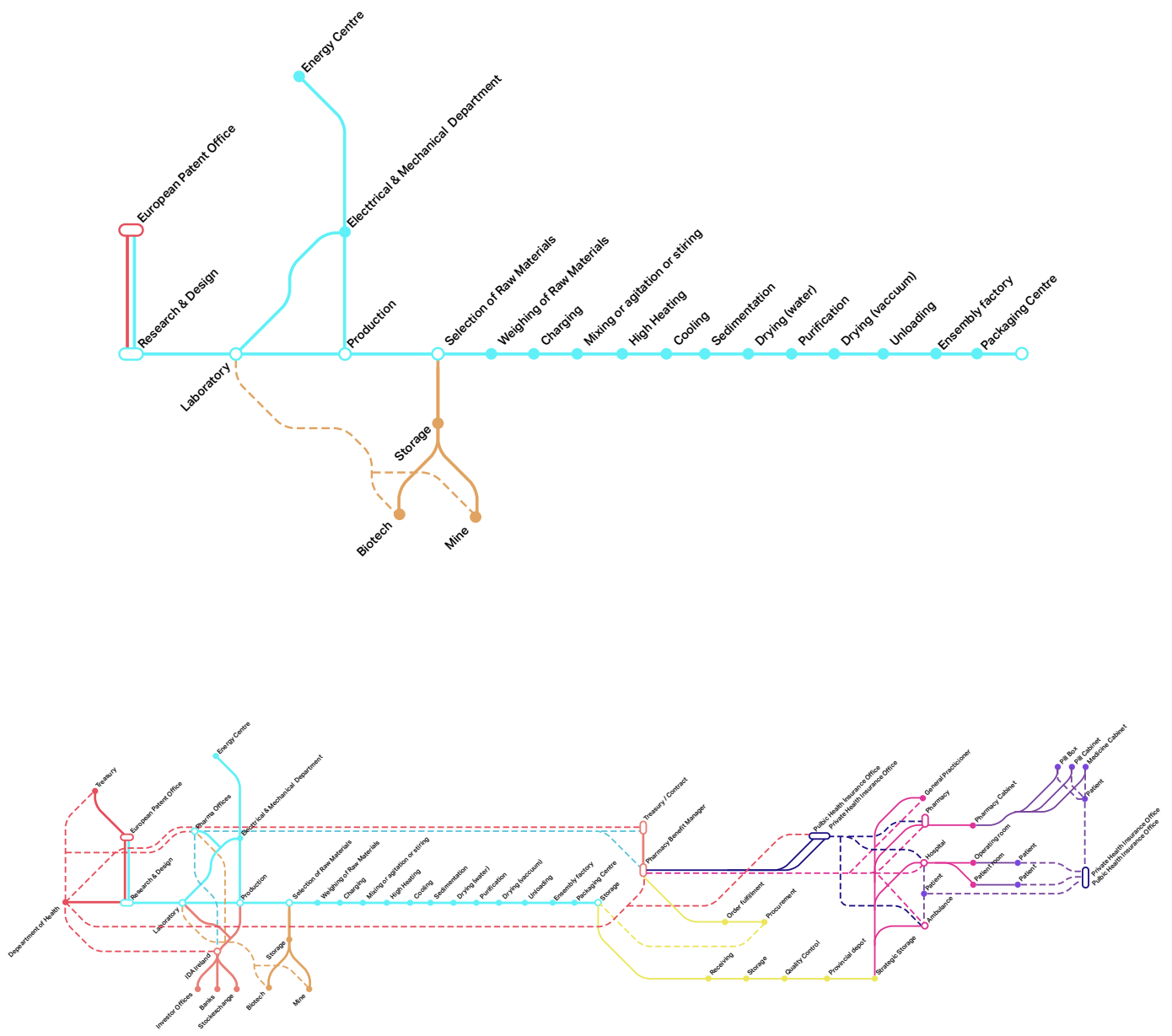
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first signs of pharmaceutical production, since the citizens went to their nearest abbey to get cured in case of sickness. The monasteries and abbeys where constructed of local materials and located just outside the settlements.

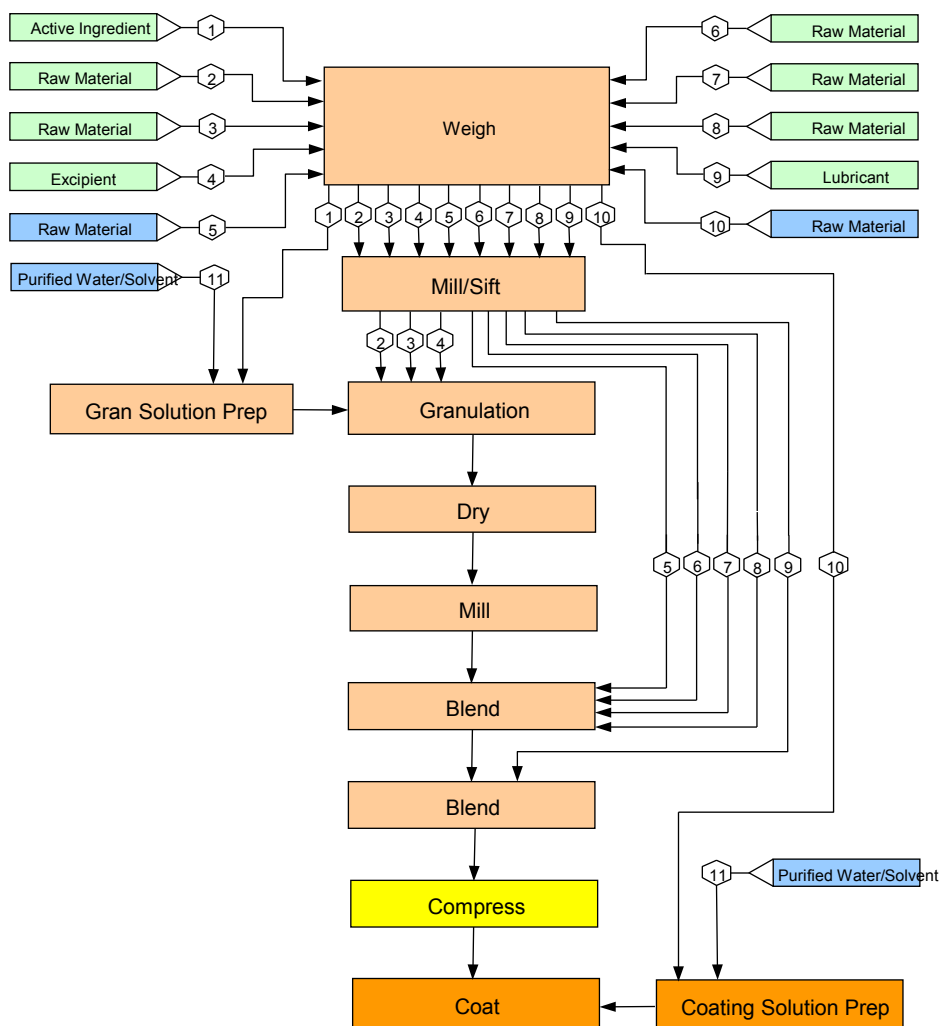
When looking at the challenges of contemporary Irish medicine production, Ireland is approaching a so called 'patent-cliff'.⁴ This implies that many of the drugs produced in Ireland are going 'off-patent' which makes it possible for competitors to produce the same medicine at a lower price.⁵ The approaching 'patent-cliff' has forced the pharmaceutical companies to start rethinking their strategies, which results in the switch to focus on 'niche-medicine'. Niche medicine implies specific medicine for a smaller group of patients.⁶ This new trend will ask for a new smaller spatial model.

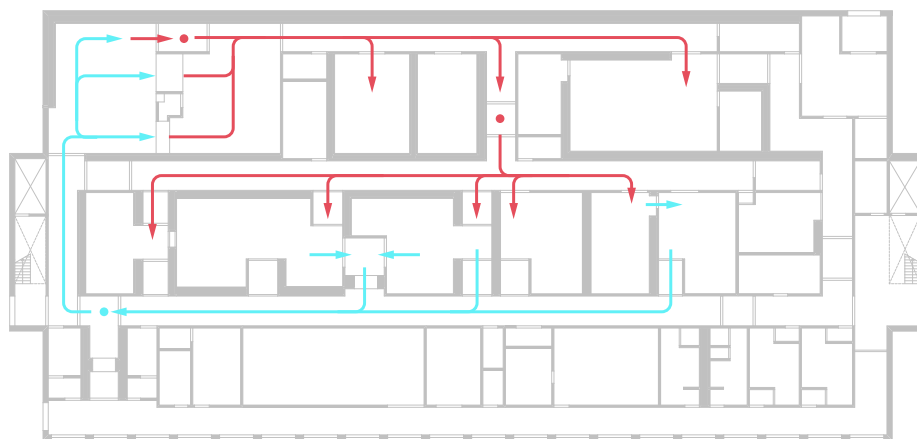
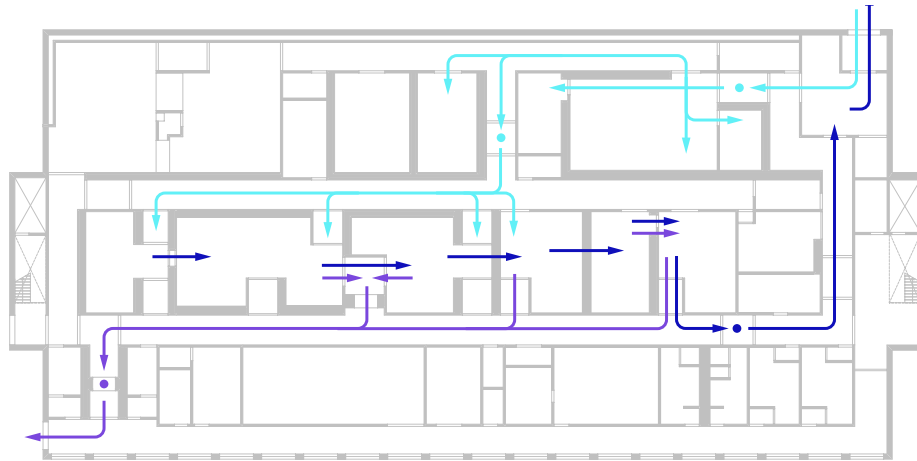
By revealing this tradition of production in the rural landscape and its specific health related production facilities, one could start questioning the contemporary architectural language of the pharmaceutical factories in the Irish landscape. By carefully analyzing the pharmaceutical system, its global impact and the spatial sequence of the factory, this project explores the realities of production in the Irish landscape, and speculates upon certain industries that maintain both a rural economy and Ireland's architectural identity.



Pharmaceutical Production Chain

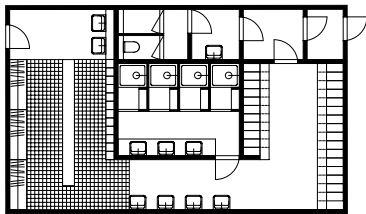
Ramon Scharff, Information, Data from different supply chain companies, September 2018



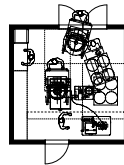


1. Material Flow
2. Personal Flow
3. Clean / Dirty Equipment

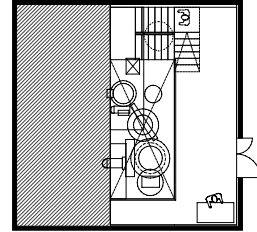
ISPE, Stevens Institute of Technology,
2016



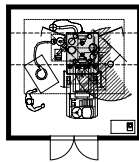
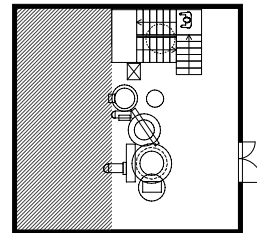
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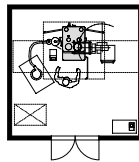
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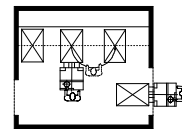
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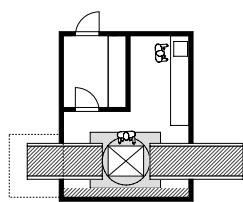
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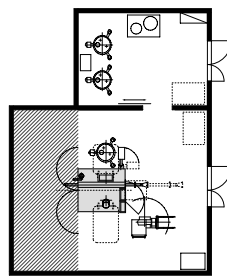
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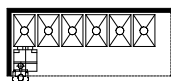
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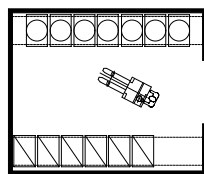
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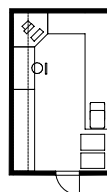
Module
Pill Coloring



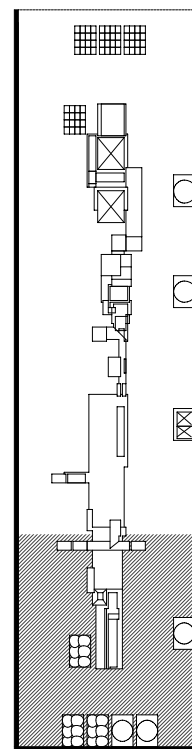
Module
Raw Materials



Module
Coloring Storage



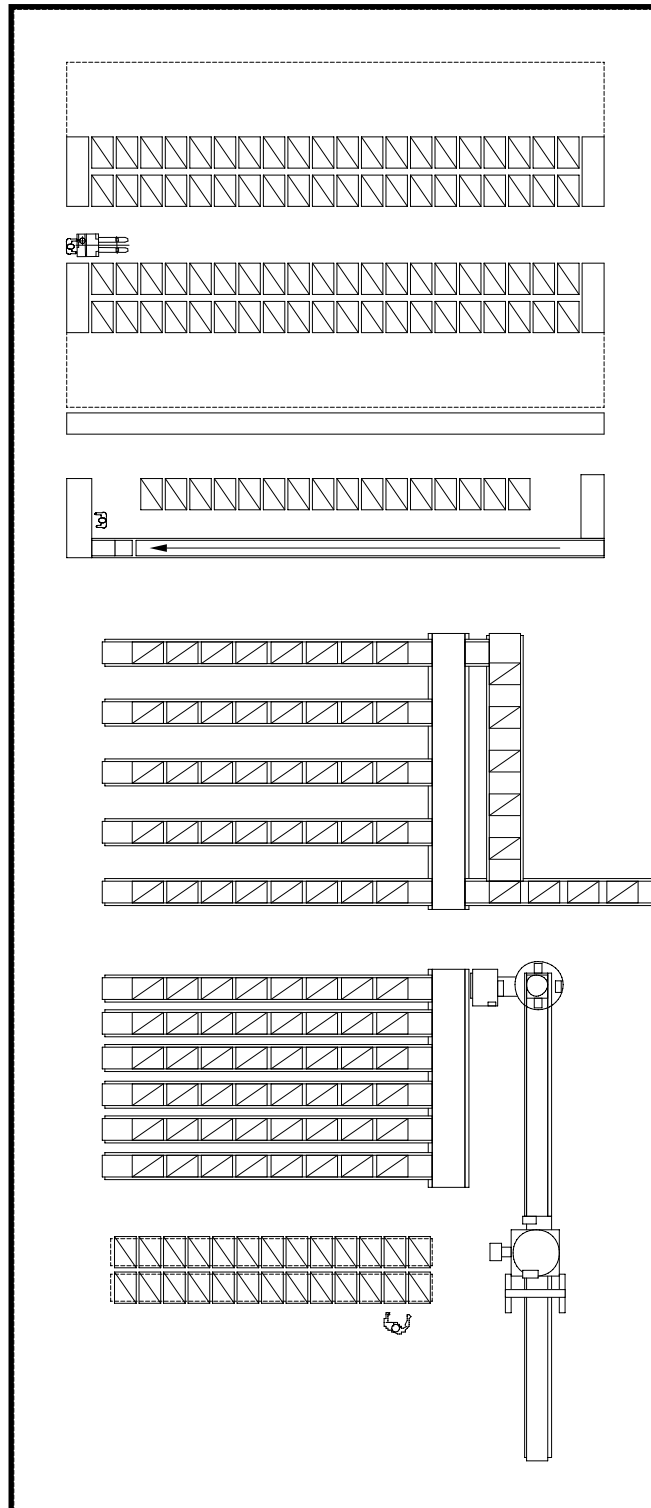
Module
Office



Module
Pill packaging

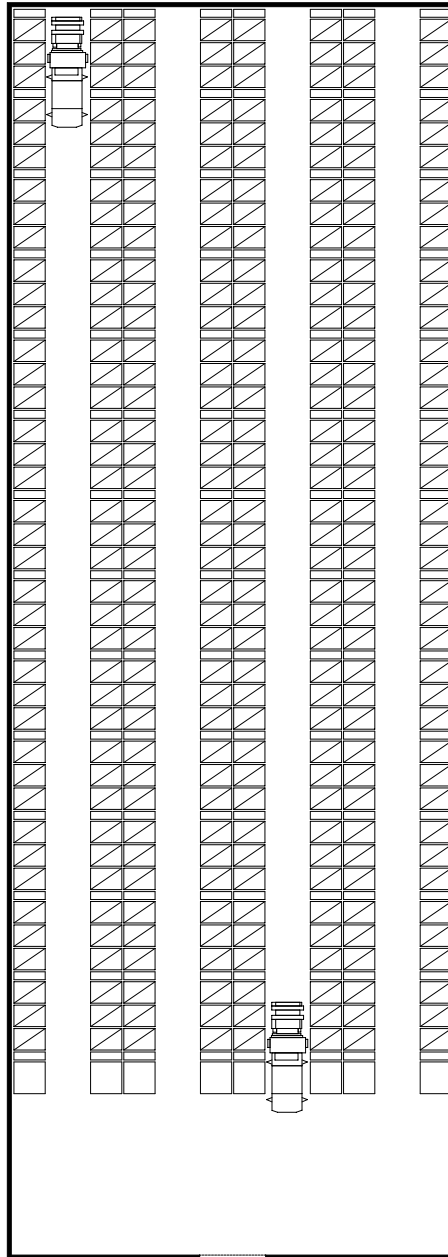
Ideal modules for pharmaceutical
production

ISPE, Stevens Institute of Technology,
2016



Ideal modules for pharmaceutical
production

ISPE, Stevens Institute of Technology,
2016



Ideal modules for pharmaceutical
production

ISPE, Stevens Institute of Technology,
2016

Architectural References

Public buildings churches, schools, halls, shops, pubs, creameries, factories, farm outhouses are among the most visible aspects of the Irish rural landscape. These remain vital in sustaining the economy, services, social life and the practical daily functioning of the countryside. They form the hubs of small villages and they are also the oldest structures, creating a sense of continuity and depth.

When taken together with dwelling houses, farmyards, outhouses and fields, these buildings form ensembles, and it is their unique combinations which give character on the rural landscape. Creameries dispersed through the dairying heartlands, surprising high-tech factories hidden in the heart of the countryside testimony to the deep-seated localism of Irish political life.

Understanding how, when and where these various building types emerged is essential to interpreting the beating heart of the rural landscape. The large farm in southern and eastern Ireland, with its traditional emphasis on mixed farming, needed a variety of buildings for its activities. Farm buildings are frequently grouped around a rectangular yard, with one side formed by the dwelling house. Many farms, especially the smaller ones, do not exhibit any distinctive lay-out of buildings.

In the north and west of the country, the older farmsteads commonly constitute a single long range of buildings, with house, stable and byre joined together. Sometimes on the poorest farms, the house stands alone without paddock or garden and is accompanied by only a small crude storehouse. The limited expression of outbuildings on western farms is linked to the pastoral traditions and mild climate but it also reflects long standing use of compact long-houses, accommodating animals and humans under one roof. Detached, functionally-specialised buildings have only appeared with the collapse of the long-house tradition. On many of the older farmsteads in south-western Ireland, the house faces the outbuildings and is separated from them by a laneway (the 'street'), which connects to the public road.

Barns and other traditional outbuildings on Irish farms are never impressive structures. They lack even elementary ornamentation and they do not exhibit building techniques of any great antiquity. Characteristically, farmers

erected only the most functional of outbuildings. Like the farmhouses, these are rectangular in plan and built with either stone or mud. The spare simplicity and frankness of agricultural buildings in Ireland and their use of local building materials connects them naturally to the land, and farmsteads form pleasing assemblages which nestle comfortably into the landscape. With the wholesale modernisation of agriculture in recent decades, many new farm buildings have been erected, especially in richer eastern areas, disrupting traditional patterns of farm lay-out. There is a tendency towards looser, free-standing and generally linear arrangements of farm buildings, consistent with increased use of tractors and bulky machinery. The erection of slatted sheds, silage pits and large metal barns to provide winter shelter for cattle and crop storage has been widespread in recent decades. These bigger structures are usually detached from and dominate the older ranges of buildings. Farm amalgamation in areas of rural depopulation has led to abandonment or partial use of many farmsteads. These frequently become unsightly cattle yards and silage stores, with wrecked buildings, rusting machinery and decaying vehicles.

One could say that Ireland has a tradition of producing Health in the Irish landscape. Ireland was known as the Island of saints and scholars after the Island was converted to Catholicism by Saint Patrick. In the 10th and 11th century, many monasteries were founded and different Abbeys were built by local chieftains and lords. The monks where most of their time writing manuscripts and books. One of the main features of the design of the abbey and monastery is the cloister garden. The cloister garden was the heart of the abbey and used to grow flowers, herbs and other plants. The first signs of pharmaceutical production, since the citizens went to their nearest abbey to get cured in case of sickness. The monasteries and abbeys where constructed of local materials and located just outside the settlements.

Another architectural type that could be found from the 1920s onwards was the one of the sanatorium. The first purpose built sanatorium in Ireland was the Royal National Hospital for Consumptives which opened in 1896 at Newcastle, County Wicklow. In 1892 the Irish-Nordrach-Im-Baden was constructed on a site near Dublin. It was built for twenty-four fee paying patients. In 1905 the number of beds has risen

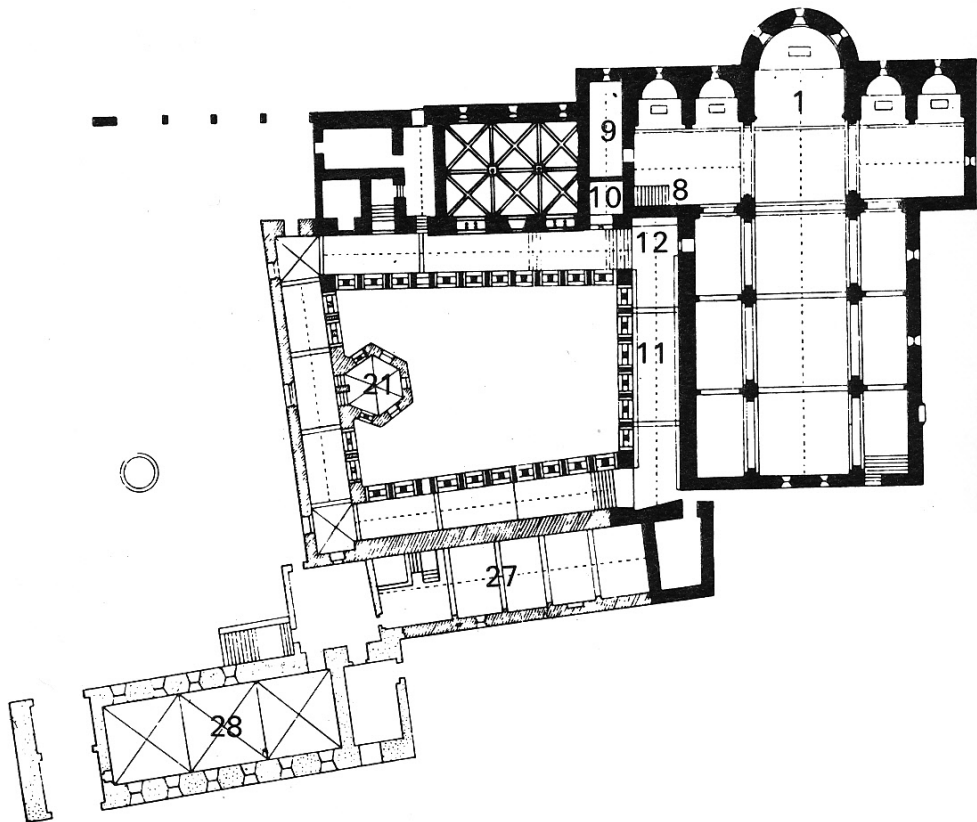
to a hundred of which a proportion were available to poorer patients paid for by charity or by the Poor Law. One aim of the campaign against tuberculosis was to bring the benefits of sanatorium treatment to the poor by the construction of public sanatoria. The claim that sanatoria could effect cures by a regime of fresh air, bed rest and nutritious food was a major part of their appeal. Propaganda to encourage the TB patient to enter a sanatorium emphasised that, caught early, the fresh air regime could at least halt the progress of the disease and possibly turn the sufferer to the community cured.

By revealing this tradition of production in the rural landscape and its specific health related production facilities, one could start questioning the contemporary architectural language of the pharmaceutical factories in the Irish landscape. By carefully analysing the pharmaceutical system, its global impact and the spatial sequence of the factory I will design around a new type, the Farmacy. The Farmacy, a pharmaceutical production facility that represents a new architectural language based on the Irish countryside and rich history of production and health.



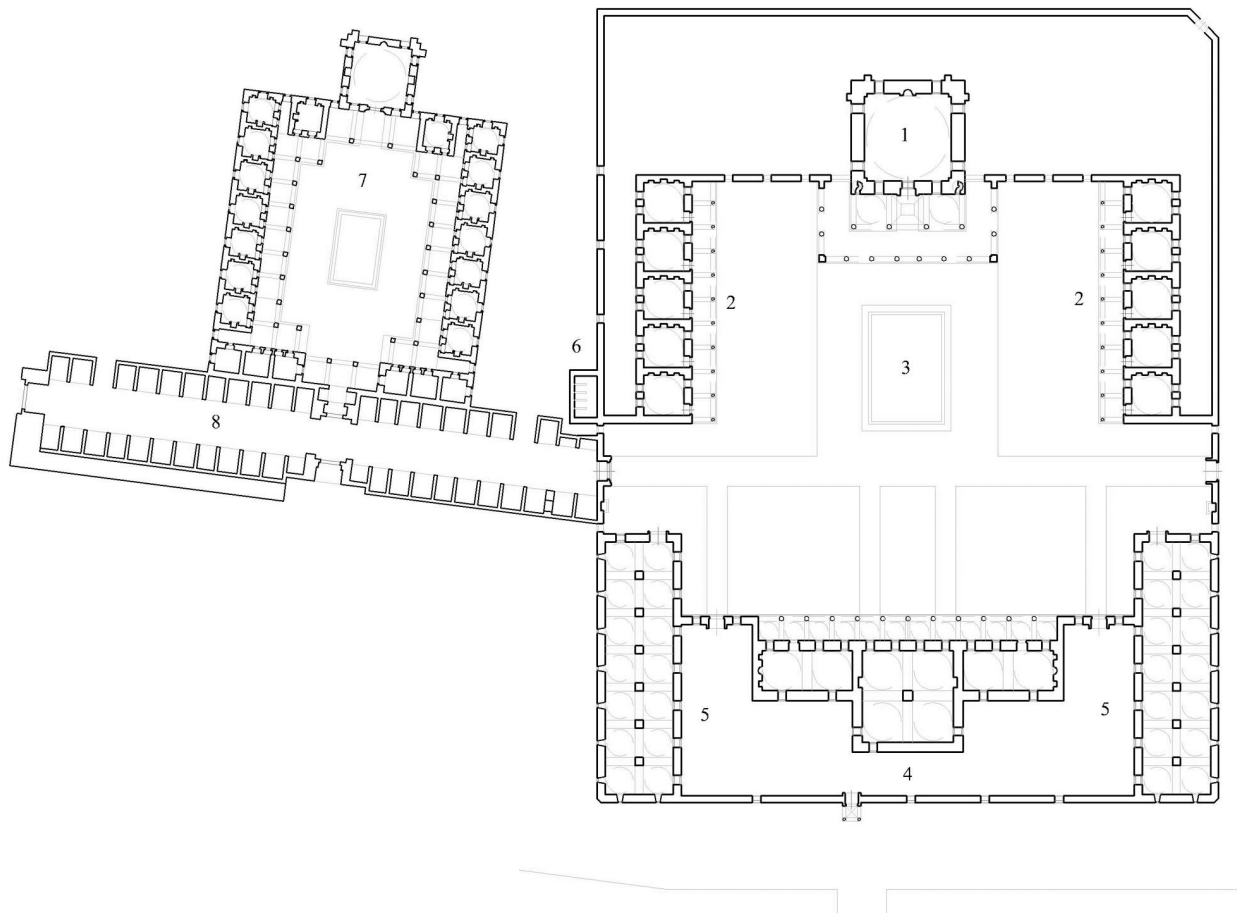
Collage of Hortuc Conclusus

Hortus Conclusus, Point Supreme
Architects, 2010



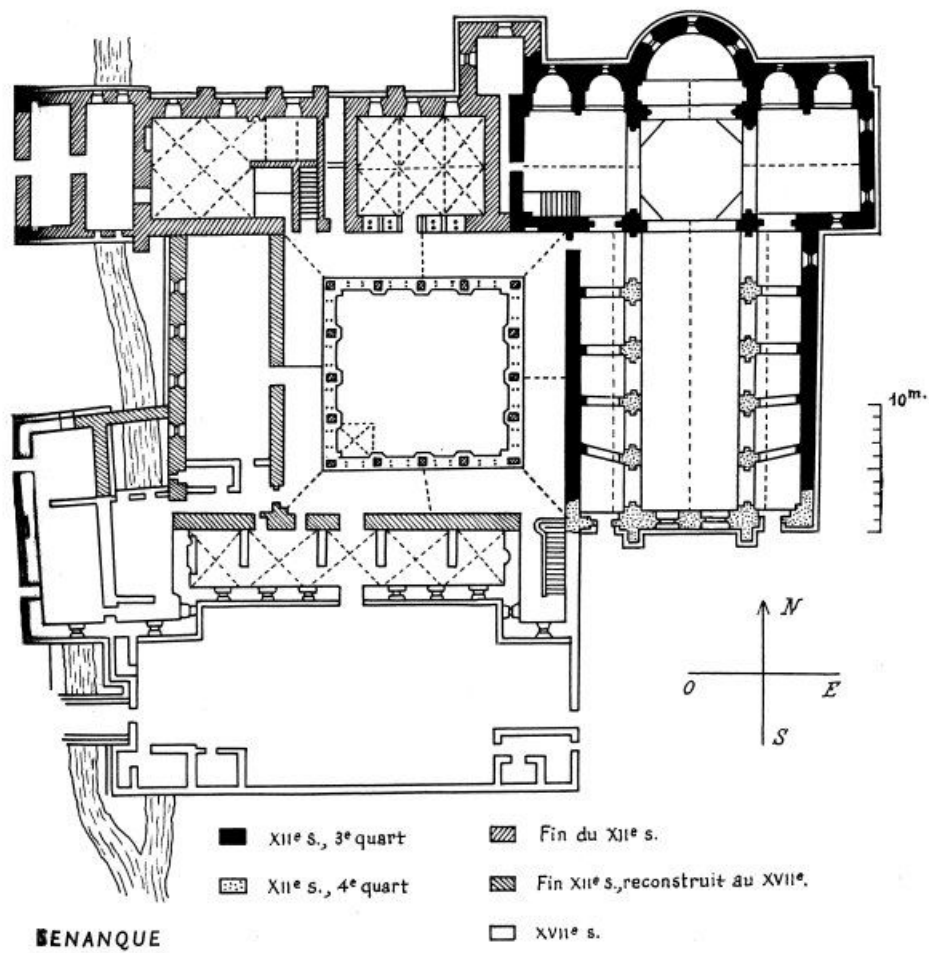
Floorplan
Abbey of Thoronet

L'abbaye du Thoronet, Draguignan, Var
department Provence, 1176



Floorplan
Tekkiye Mosque

Tekkiye Mosque, Damascus, Syria, 1495



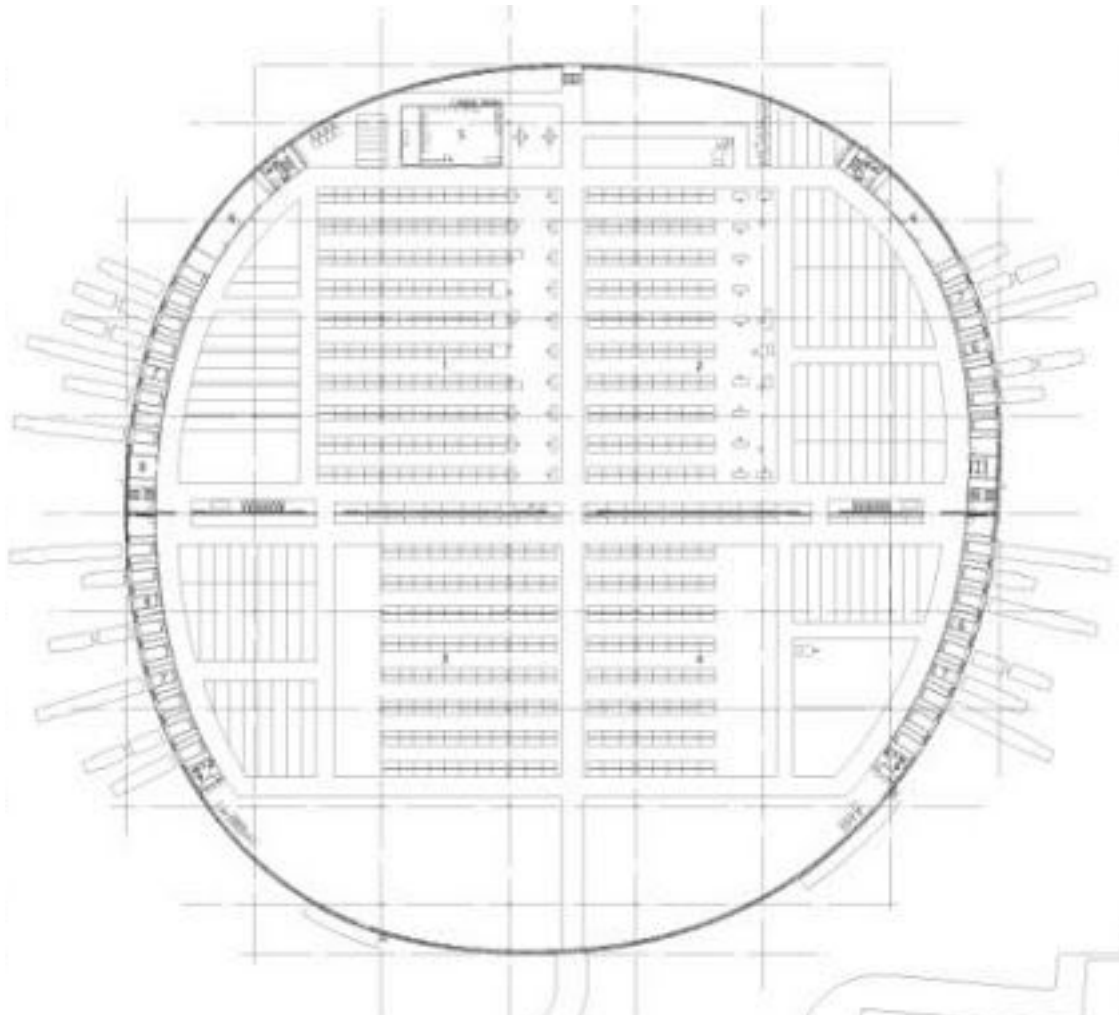
Floorplan
Sénanque Abbey

Sénanque Abbey, Gordes, département
of the Vaucluse in Provence, France,
1178



Photograph of the Senanque Abbey

Sénanque Abbey, Gordes, département
of the Vaucluse in Provence, France,
1178



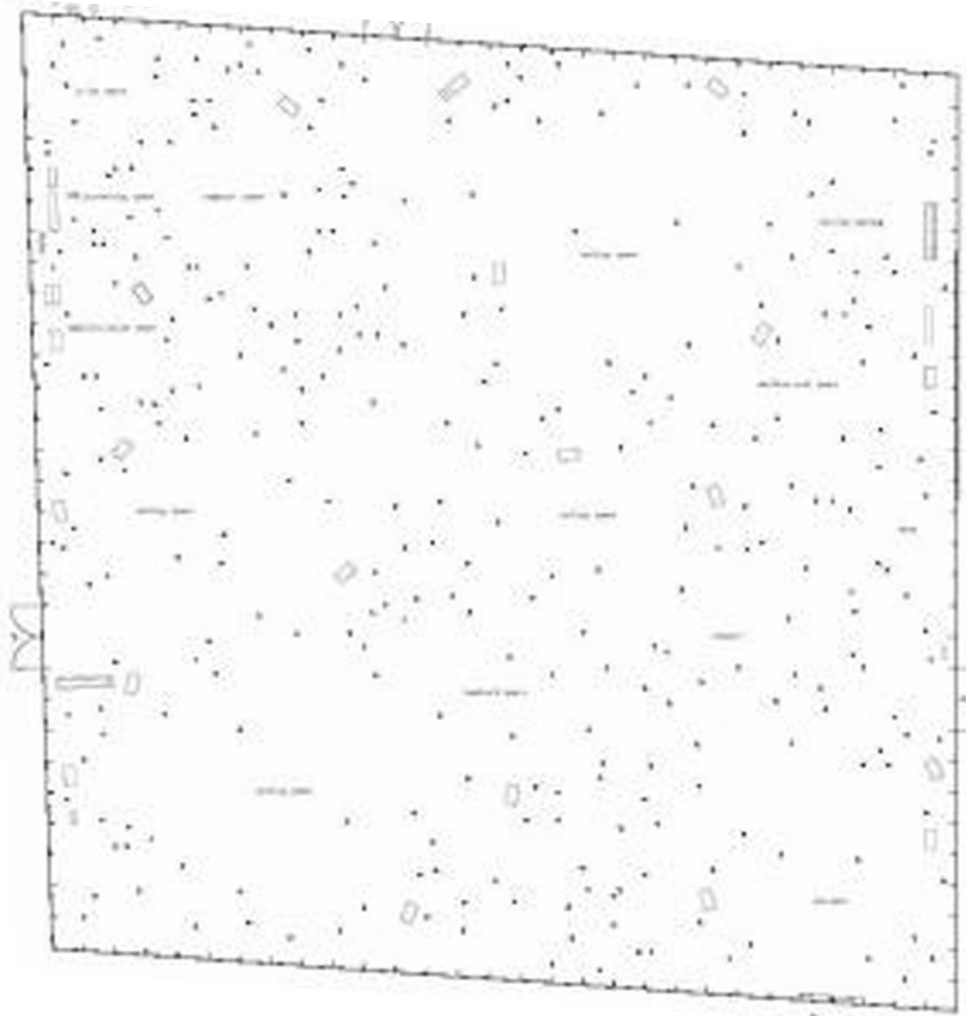
Floorplan
Factory building Vitra Campus

SANAA (SEJIMA + NISHIZAWA) factory
building, vitra campus, weil am rhein
Ryue



Photograph
Factory building Vitra Campus

SANAA (SEJIMA + NISHIZAWA) factory
building, vitra campus, weil am rhein
Ryue



Floorplan
Kanagawa Institute of Technology

Kanagawa Institute of Technology ,
KAIT Workshop by junya.ishigami +
associates as Architects, 2010



Photograph of Kanagawa Institute of Technology

Kanagawa Institute of Technology ,
KAIT Workshop by junya.ishigami +
associates as Architects, 2010



Impression
Entrance The Farmacy

Ramon Scharff, The Highway and the
Country, 2019

Project

A new Irish pharmaceutical production type that provides an alternative to the existing facilities in a changing Irish pharmaceutical landscape, while at the same time generating a new working environment that improves the wellbeing of its users.

Description

This project explores the realities of production in the Irish landscape, and speculates upon certain industries that maintain both a rural economy and Ireland's architectural identity. The Farmacy, houses a pharmaceutical production facility within the traditional scale of the smallholding or farm, while using the authentic spatial model of the abbey. It provides an alternative to the existing fragmented pharmaceutical production landscape. In its density, scale, repeatability and seriality it continues to define an architecture of rural Ireland, while they also give a much-needed identity to an economically important emerging industry.

The Farmacy builds upon the rich tradition of production in the Irish rural landscape, while also reinterpreted the spatial model of the Abbey, which can be described as the first architectural type for pharmaceutical production. The hybridization of these types uses the cloister garden as a symbolic spatial feature that represents a new form of wellness. Wellness in the form of a garden with traditional plants that can grow in Ireland and have a health-giving property. It generates pleasant views for its employees, attractive spaces to stay for its surroundings, the community and during a lunchbreak.

The project combines the current fragmented model of the pharmaceutical industry into a new synthetic type, the Farmacy. The proposed Farmacy is located in the village of Laghy, just under Donegal alongside the Highway. By positioning it alongside the Atlantic Corridor it generates an economic impulse that could help to develop the Highway.

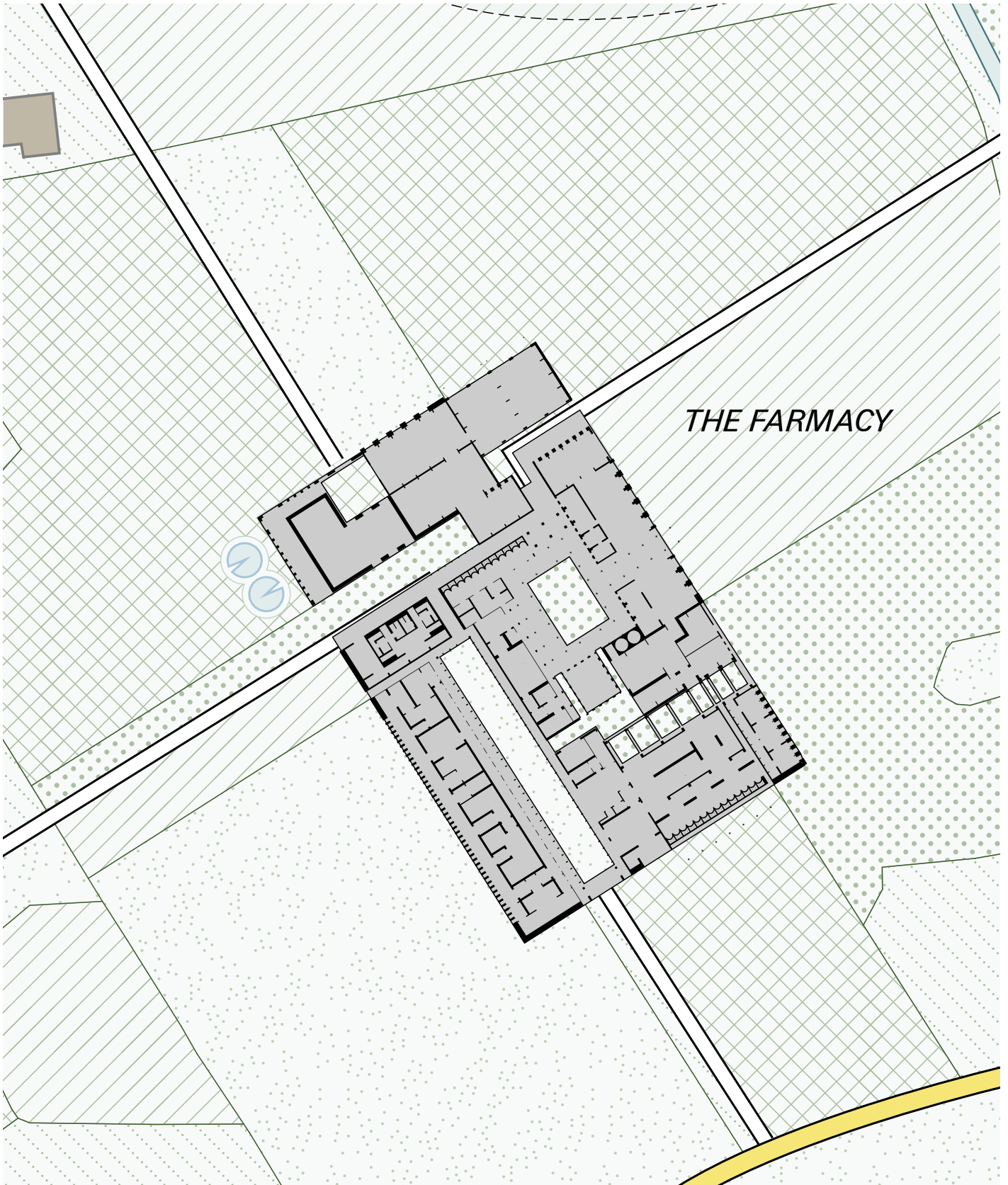
The small scale production facility relates to the scale of the traditional Irish farm. It combines spaces for employees, laboratory, API production, pill assembly, pill packaging, pill boxing, water treatment and an energy centre into one ensemble.

The spatial configuration of the Farmacy is based on the traditional model of the monastery, the first space for pharmaceutical production. Pharmaceutical gardens are created in between the buildings that are accessible for visitors and local inhabitants, without losing any efficiency of the production line.

The gardens provide a space for the community and at the same time providing a glimpse in the production process of pharmaceuticals. Flowers, herbs and plants that are grown in the gardens are typical medical herbs like Burdock, Nettle, Meadowsweet, Coltsfoot, Yarrow and Mullein that especially grow in this part of Ireland.

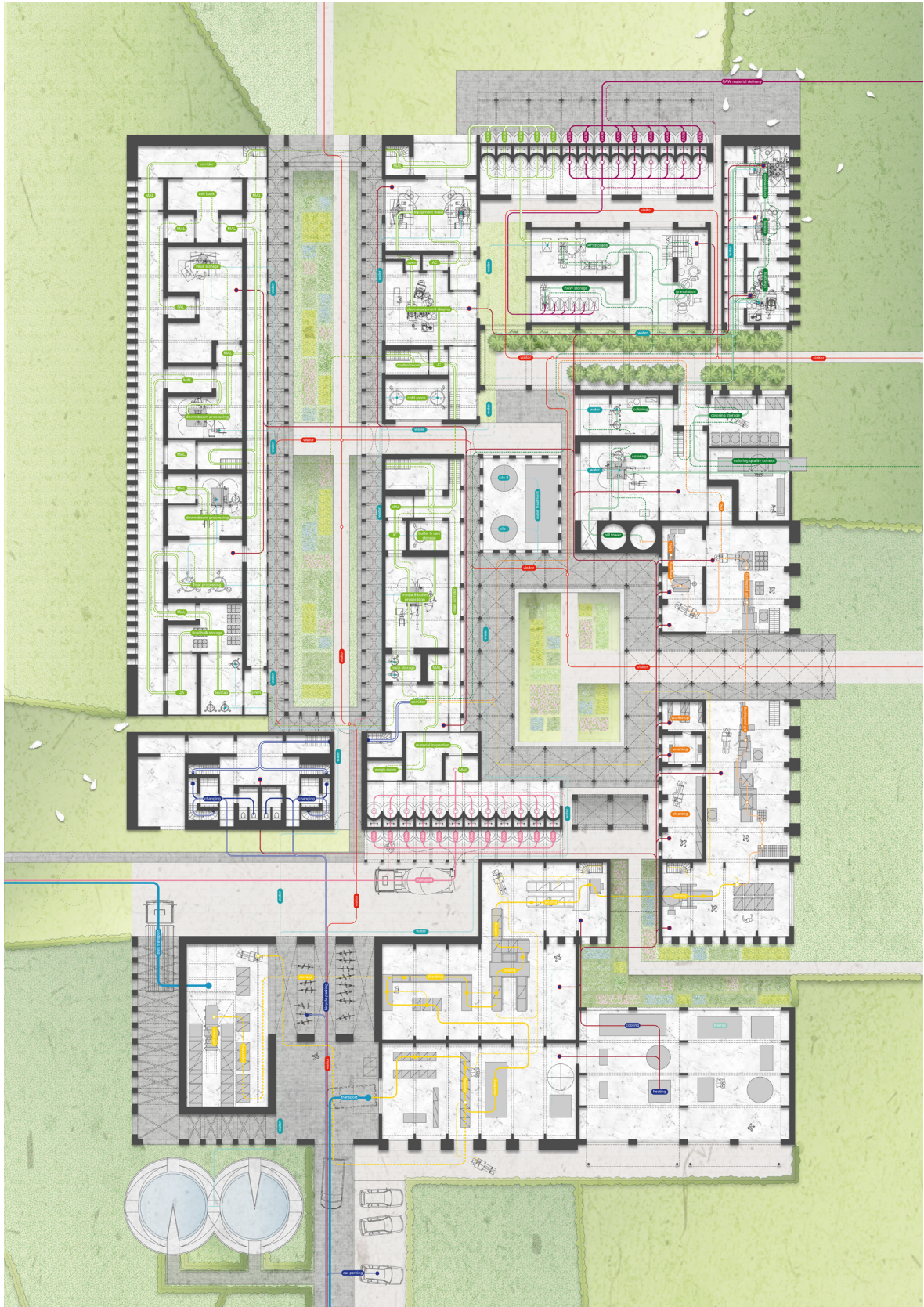
The proposed materials are a mix of local building materials like limestone for the plinth of the buildings, combined with high tech steel and shiny aluminium cladding. The usage of local stone connects them naturally to the land, while the aluminium cladding refers to the tradition of simplicity in farmsteads and complements the new function of the high tech pharmaceutical industry. The ensemble, mainly covered in one material matches the tradition of the monastery where one could define different shapes but it still appears as a whole by using one material.

From a distance, one could define a Farmacy in the landscape by its vertical elements. Where one could define a farm by its vertical silos, towers or hay barns. The Farmacy exhibits its verticality by the storage towers for pills and raw materials.



Siteplan
The Farmacy

Ramon Scharff, *The Highway and the Country*, 2019



Floorplan
The Farmacy

Ramon Scharff, The Highway and the
Country, 2019



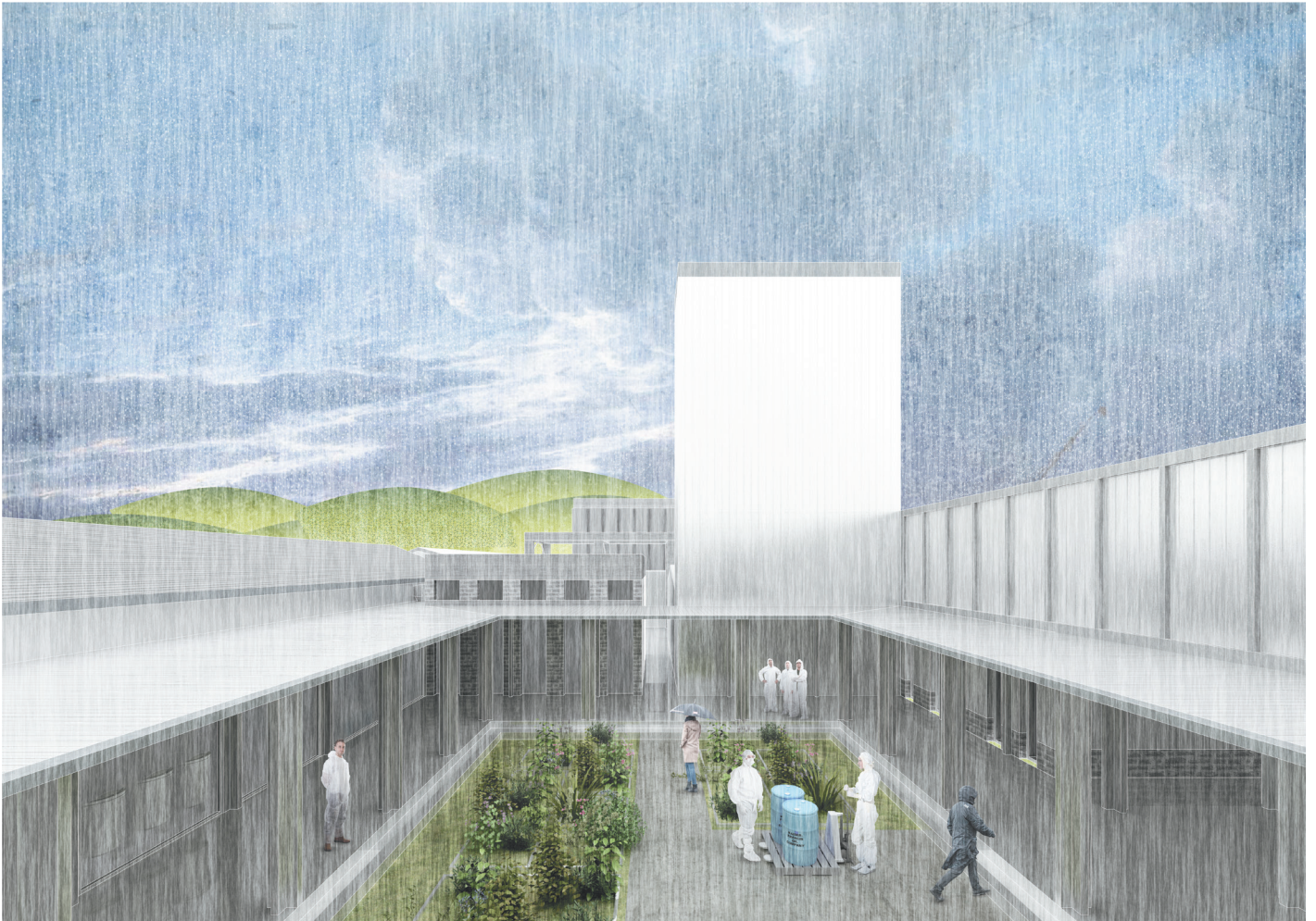
Impression
Shaped of the Farmacy

Ramon Scharff, The Highway and the
Country, 2019



Impression
Hortus Conclusus The Pharmacy

Ramon Scharff, The Highway and the
Country, 2019



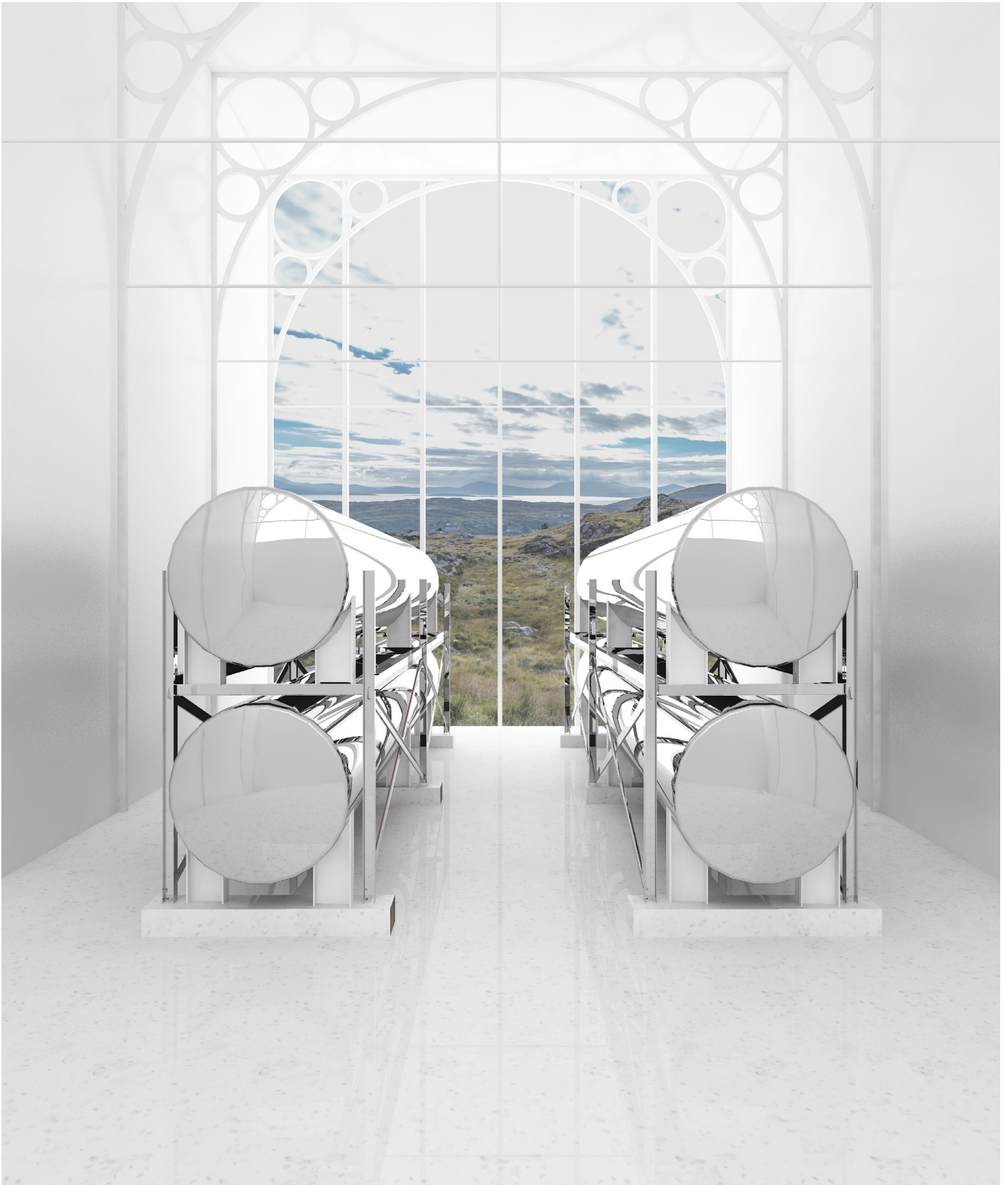
Impression
Pharmaceutical Garden

Ramon Scharff, *The Highway and the Country*, 2019



Impression
Interaction with the local community in
the Pharmaceutical Garden

Ramon Scharff, The Highway and the
Country, 2019



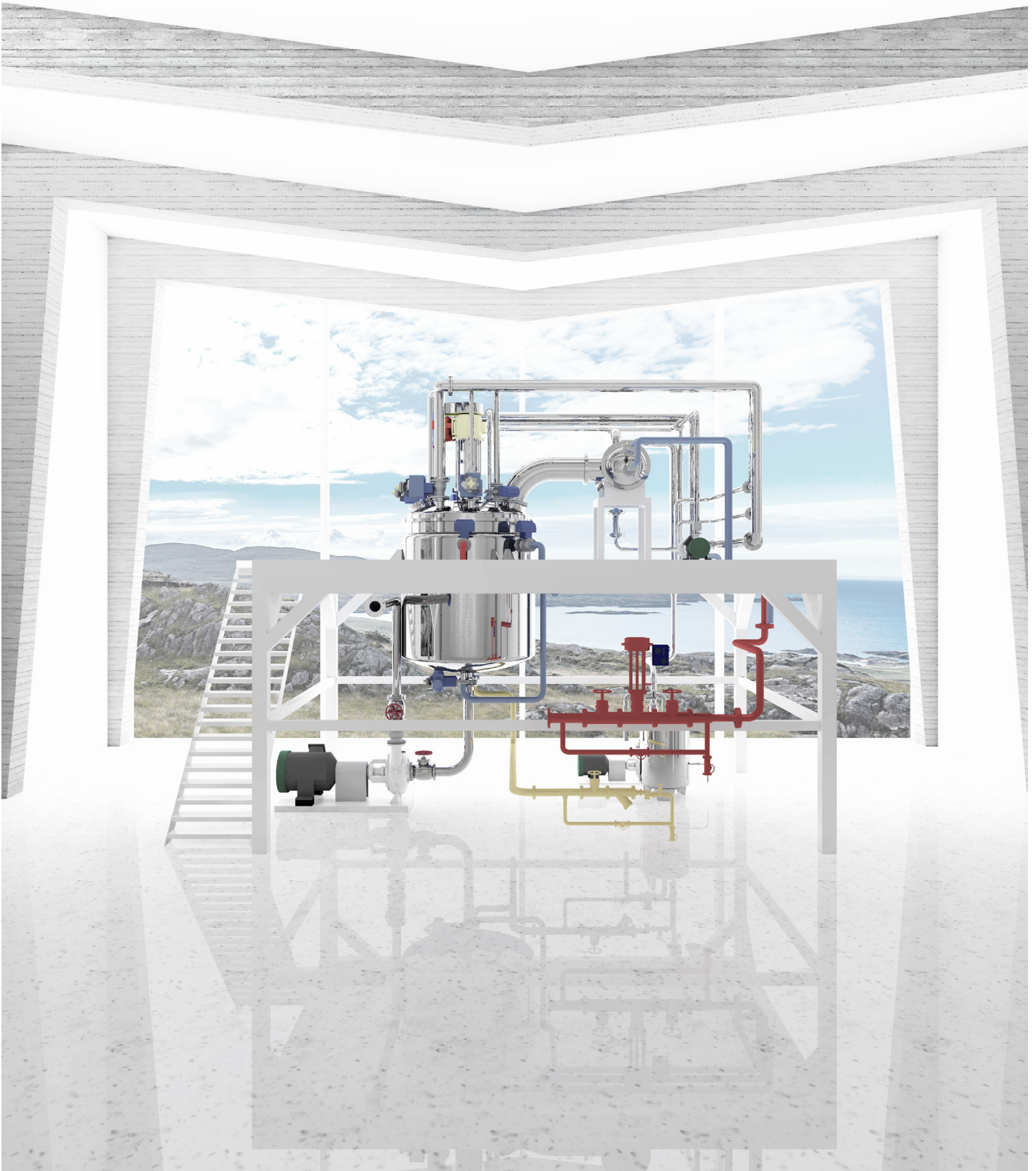
Interior Impression
API / RAW Storage

Ramon Scharff, *The Highway and the
Country*, 2019



Interior Impression
Pill Packaging

Ramon Scharff, The Highway and the
Country, 2019



Interior Impression
API Production

Ramon Scharff, *The Highway and the Country*, 2019



Interior Impression
Pill Storage

Ramon Scharff, The Highway and the
Country, 2019

Expert Interviews

Despite the very real impact of the patent cliff, the pharma industry in Ireland has been boosted by a stream of significant new investments in recent years, particularly in the biopharmaceutical space. According to Matt Moran, director of Ibec group PharmaChemical Ireland, which represents the industry in Ireland, an estimated in capital expenditure is currently going into the ground in the sector here.

The statistics around Ireland's pharma sector are impressive: nine of the world's top 10 pharma companies have operations here; Ireland is the eighth largest producer and the fifth largest exporter of pharmaceuticals globally; 120 pharmaceutical companies have bases in this country; and 33 pharma and biopharma plants are FDA approved.

Pharma-chemical products make up half the total goods exported from Ireland making the sector critical from an external trade perspective. In 2013, the value of exports was just over 50bn, down by 8pc or around 5bn from the previous year. This followed a fall of under 2pc in 2012 over 2011 as the impacts of the cliff started to take hold – Ireland manufactures in part or full six of the top ten blockbuster drugs that have or will come off patent between 2011 and 2016.

"There was definitely a fall in exports driven by the patent cliff and related issues," says Moran. "Another impact of the cliff and general over capacity in the sector has been a number of high-profile mergers which have undoubtedly had impact in this country with a number of high profile plant closures.

"Balanced against this has been a more or less continuous stream of new investments over the past couple of years. In the main these investments are in biopharmaceutical manufacturing, high end chemical synthesis or product and process development."

And the fall in exports in the sector is starting to reverse, he says. "We'd be very positive that as a result of the new investments going in at the moment we'll probably see an increase in exports taking place in the next couple of years." The current series of investments is expected to result in the creation of more than 2,000 new direct

jobs in the sector. At the moment, pharma in Ireland employs around 25,000 people directly and another 25,000 indirectly. And they're high quality jobs. "Over 65pc of those employed in the industry have a third-level qualification, so it's important place of work for those who have graduated, especially in science, technology, engineering and maths (Stem) subjects," says Moran.

The recent investments have come on the back of a strategic focus on the sector, particularly in the area of biopharmaceuticals. "We had been lobbying very hard for investment, especially in biotech. I think we've probably been more successful than we even thought we would be in attracting investment – the Bristol-Myers Squibb investment [of over 700m] is an example of that. "We really are on the map now as being a location for biologics manufacturing and that was the objective. We had also been pushing fairly hard for more investment in process development and product development and that certainly is happening. That helps to anchor the companies in Ireland and also helps to attract the new molecules."

The investments fall into two main categories – expansions of existing operations by companies that have operated successfully in Ireland for some time and brand new greenfield sites by companies entering the country for the first time. "The expansions tend to fall into two further categories – product or process development and advanced for biopharmaceutical manufacture," says Moran. Advanced manufacture includes high potency synthesis with options for continuous or plug and play operations such as the new synthesis plant recently opened by Pfizer at its Ringaskiddy facility. "This is actually a retrofit of an older phased out plant," says Moran. "It's an excellent example of a plant moving in tandem with cutting edge developments in the space at a global level." MSD at Ballydine, meanwhile, has recently established a state-of-the-art product development facility co-located with its chemical synthesis plant and involving a 100m investment. The facility is concentrating on drug development and chemical synthesis.

Elsewhere, Abbvie recently completed an 85m expansion at its pharmaceutical manufacturing facilities in Sligo. The company said the investment builds capability for existing products and potential therapies in its pipeline. And Mylan is in the process of investing 75m a year over a five-year period to 2016 developing its pharmaceutical capabilities in Dublin and Galway. This includes funding for expanded R&D capabilities.

Growing the biopharma manufacturing base is also hugely important for the future of the industry. "It is vital that Ireland is a major player in this arena. The recent explosion of investment in this field in this country has pushed Ireland to second place behind the USA as a centre for the manufacture and development of such products," Moran says. Top of the list of that explosion of investment was the announcement in November 2014 that Bristol-Myers Squibb is planning to build a new state-of-the-art, largescale biologics manufacturing facility at its Cruiserath site in Co Dublin that will produce multiple therapies for the company's growing biologics portfolio. The 30,000-sq metre project will house six 15,000-litre bioreactors and a purification area as well as office and laboratory space. The plant will be built on the grounds of the company's existing bulk pharmaceutical manufacturing plant. Bristol-Myers Squibb says it expects the investment to be around US\$900m (734m).

Other high profile and high value investments in this space include Eli Lilly's 330m spend on a second biomanufacturing facility at its Kinsale campus. "What makes the Eli Lilly investment even more interesting is that fact that it is co-located with existing chemical manufacture, making this site unique in Ireland and Europe," says Moran. "Eli Lilly continues to invest in product and process development at the Co Cork site, making it a living example of the development plus manufacturing strategy espoused in the PharmaChemical Ireland series of strategic plans."

Allergan, meanwhile, is spending US\$350m on a new biologics facility in Westport. The investment will enable the company to expand the manufacturing capacity for Botox and develop a manufacturing base for the next generation of biologic products currently in the Allergan pipeline.

Pfizer is investing 145m at its Grange Castle biotechnology manufacturing site in Dublin that will enable it to introduce two new processing suites and expand current production and product testing capabilities. Pfizer's Grange Castle facility is one of the largest biotech manufacturing sites in the world and currently produces two of the company's blockbuster medicines – Enbrel and Prevenar 13. Elsewhere, MSD at Brinny, Genzyme-Sanofi in Waterford and Amgen in Dublin are all continuing to invest in their biotech operations.

New Concepts

Making up the rest of the capital being invested are a number of companies that are new to Ireland. These are generally emerging biotech companies tending to specialise in the rare or orphan disease space - similar to Genzyme, which established in Ireland a number of years ago, says Moran.

"These are very high value products aimed at diseases of unmet therapeutic need in the main," he says. "The value of these products means that they can achieve blockbuster or close to blockbuster status relatively quickly and from a national perspective can replace revenues lost as a result of the patent cliff."

A good example of these companies that are relatively new to Ireland is Alexion, which has embarked on a three-phase investment here. Earlier this year, it revealed it was acquiring part of the part of the original Elan plant in Athlone to establish aseptic filling operations in the country. The company is also investing 75m in two locations in Dublin that will house its new global supply chain facility, as well as warehousing, laboratory and packaging operations. Alexion plans to employ 300 people in Ireland by 2016.

In Limerick, meanwhile, Regeneron is investing 240m in a state-of-the-art, biopharmaceutical production facility within an 11.88 hectare site, previously owned by Dell in the Raheen Business Park, Limerick. The investment programme will involve the refurbishment of existing buildings on the site and the construction of a quality control laboratory to transform the site into a world-class biopharmaceutical campus. Up to 300 people are expected to be employed at the facility by the end of 2016.

Elsewhere, Biomarin has bought Pfizer's biologics manufacturing facility in Shanbally, Co Cork. California-based Biomarin focuses on the treatment of rare diseases and has a number of new product candidates in late development. It's the first time the company has placed internal biopharmaceutical production activities outside of the US.

And Jazz Pharmaceuticals is currently in the process of constructing a 50m, 5,100 sq metre manufacturing and development facility in Athlone. Particularly notable is the fact that it's the company's first ever construction of a manufacturing facility anywhere in the world.

Ireland's pharma sector remains strong and the country continues to be a location of choice for the launch of new products, says Moran. "There has been a patent cliff impact but we've had a strategic response and that seems to be paying dividends at the moment."

Bibliography

Barry McCall, "*A vibrant pharma sector*", The Irish Times, December 14, 2017.

Robert Pogue Harrison, *Gardens, an essay on the human condition*, (Chicago, University of Chicago Press, 2009), Ch. 9.

F.H.A. Aalen, Kevin Whelan, Matthew Stout, *Atlas of the Irish Rural Landscape*, (Toronto, Buffalo, University of Toronto Press, 2011), 235, 236, 237, 238

Dan O'Brien, "*Is Ireland going over a patent cliff*", The Irish Times, June 21, 2013.

Shane Enright, Mary Dalton, "*The Impact of the Patent Cliff on Pharma-Chem Output in Ireland*", Journal of the Statistical and Social Inquiry Society of Ireland, Vol. XLIII (March 2014): 91-113.

Chie Hoon Song, Jeung-Whan Han, "*Patent cliff and strategic switch: exploring strategic design possibilities in the pharmaceutical industry*", SpringerPlus, May 23, 2016.

Afterword: Reflection of Project in Relation to Discourse

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