

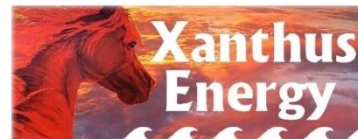


# Optimum North England Offshore Wind Turbine Assembly & Installation Factory

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# The Partners



# Overview of Work Programme

## Topics for Investigation

“Four topics are vital to the success of offshore wind”

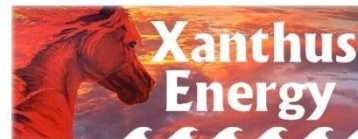
*NWIP launch programme*

- **Foundation system optimisation**

- ~~Bearings quality improvement~~

- ~~AC/DC electrical conversion~~

- **Installation technologies**



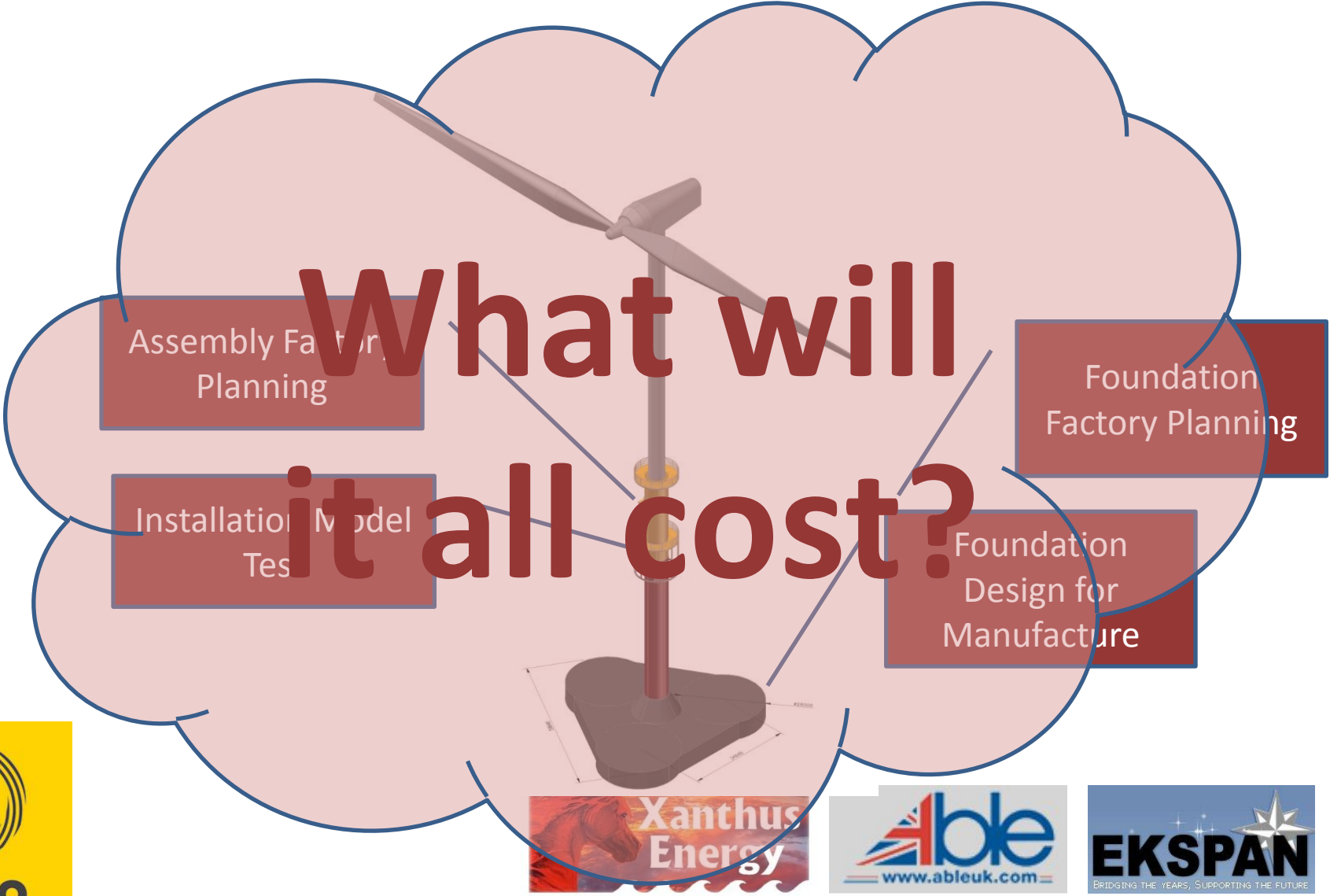
# Overview of Work Programme

Focus: *SeaBreeze*

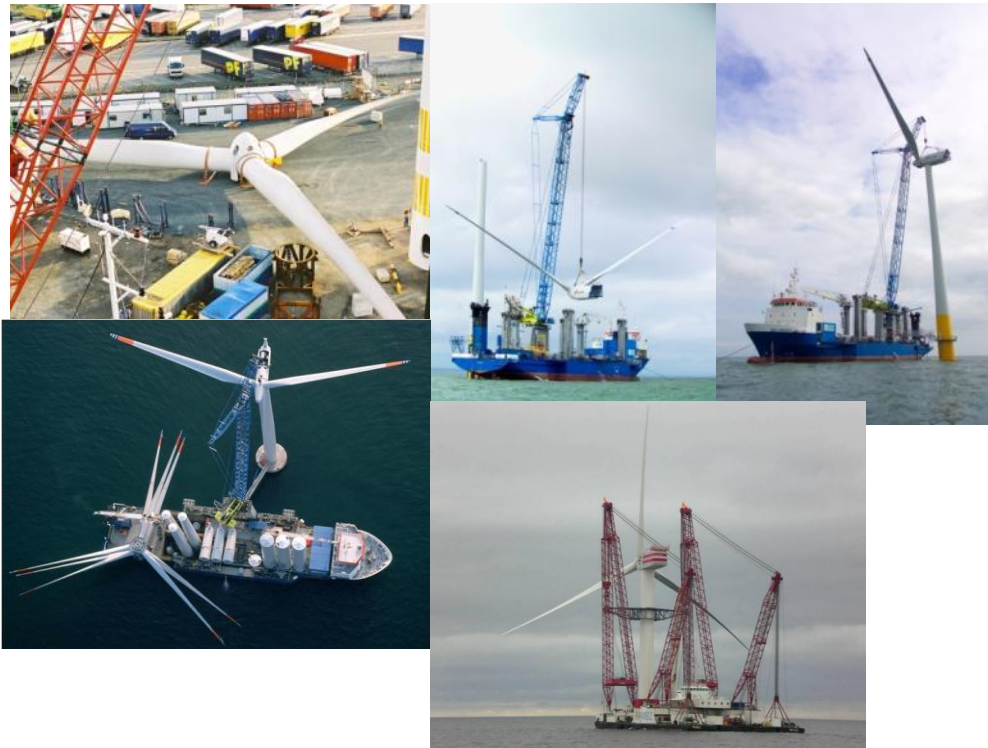
A self-installing  
Buoyant  
Fully assembled  
Wind turbine + Foundation



# Overview of Work Programme



# What has been done to date?

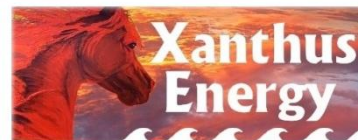


## Pedigree...

**Beatrice: 1 per year**

**Rhyl Flats:  
24 foundations installed  
over 4 months = £360,000 /  
foundation**

**Thornton Bank:  
8 months to manufacture 6  
foundations**



# Offshore Wind Issues

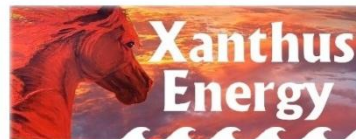
**DANGER**

**RISK**

**COST**

# What is needed?

- *A cheaper way to build wind farms offshore*
- *A disconnect from specialist installation vessels*
- *A faster way to build offshore wind farms*
- *Freedom from weather windows*



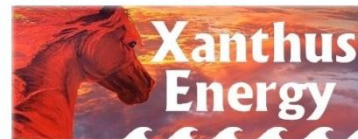
# The 2020 - 32GW - Challenge

- **Delivery rate : 2-3 / week per round 3 zone**
  - Manufacture of foundations / towers / WTGs
  - Shipping logistics
  - Assembly time
- **Distances offshore of ...**
  - up to 200 kms
  - Vessel trip time 3 – 10 hours (one way)

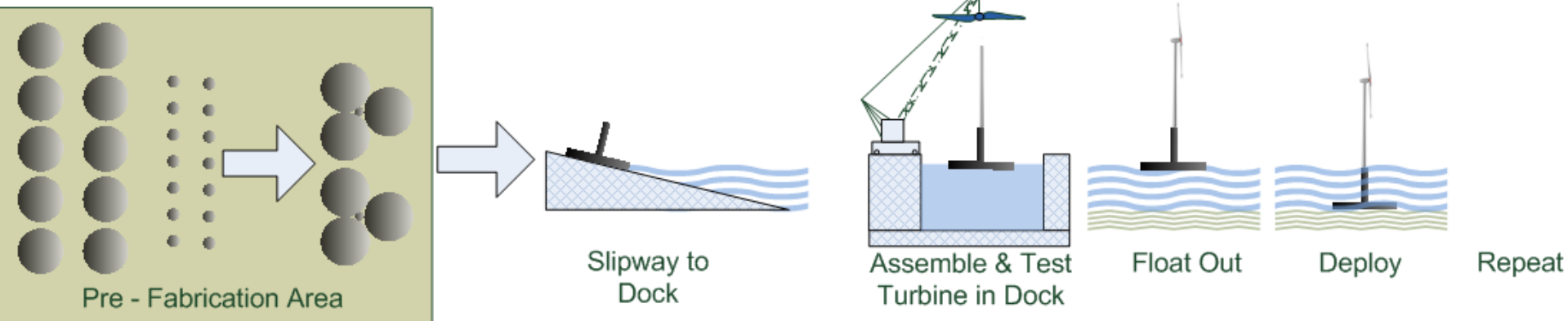


# Round 3 Statistics

Zone	Name	Size (Area)	Distance from Land	Average Tow time (out)	Return time	Water Depth		Projected Installed Power	No of WTGs
		[km2]	[km]	[hrs]	[hrs]	Max [m]	Min [m]	[GW]	[5MW]
3 ASP	Dogger Bank	8600	56 - 107	13.40	4.40	63	18	9	1800
3 AHP	Dogger Bank	8601	151 - 198	27.99	9.42	63	18	9	1800
4 ASP	Hornsea	4735	60 - 108	13.76	4.53	70	30/40	4	800
4 AHP	Hornsea	4736	34 - 77	9.22	2.99	71	30/41	5	1000
5 ASP	Norfolk	6035	158 - 192	27.92	9.44	70.1	5	5	1000
5 AHP	Norfolk	6036	86 - 118	16.41	5.50	70.1	5	5	1000

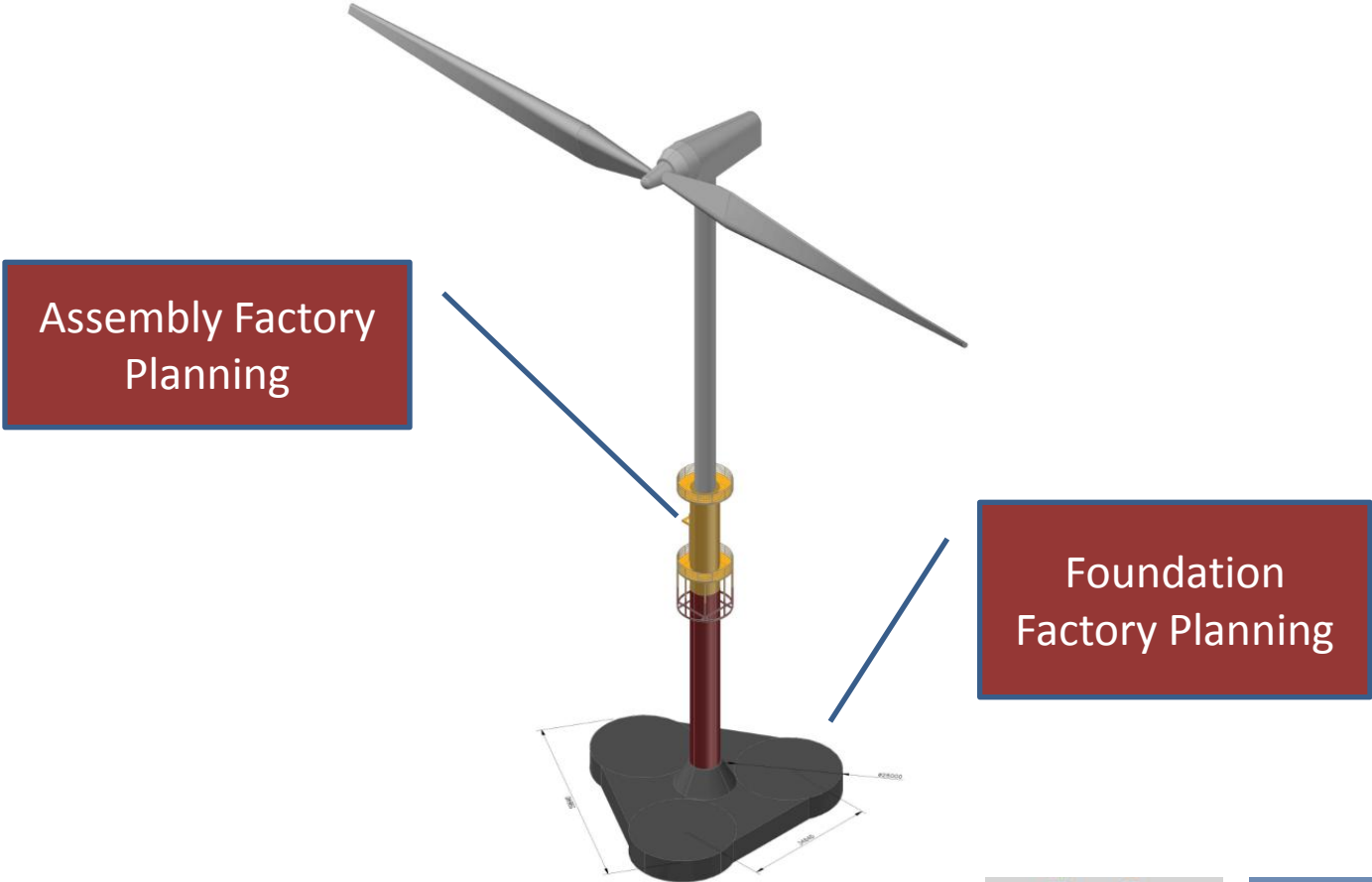


# Production Process (Example)



- **How much more simple it can be...**
- **Install and commission on land**
  - 24/7 operations
  - Onshore labour rates
  - Minimum weather impact
- **Single trip installation ... 3-4 hours install time using standard tugs**
- **Dramatically reducing cost, timescales and risk**

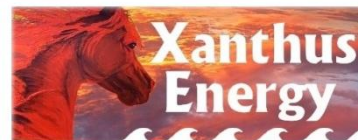
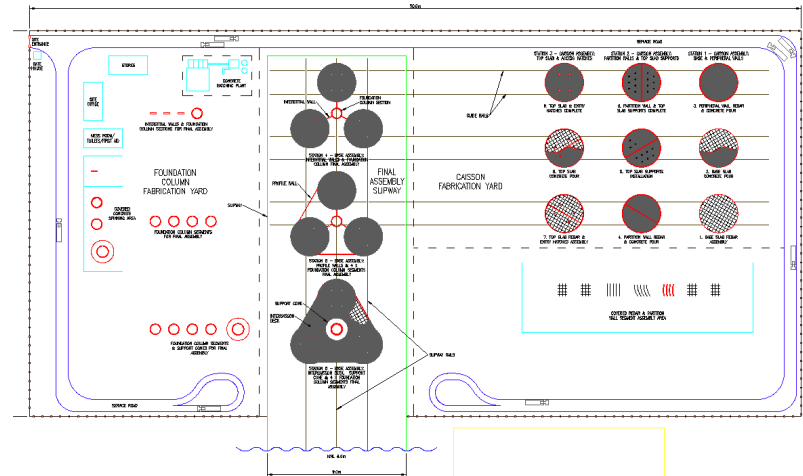
# Overview of Work Programme



# Foundation Factory

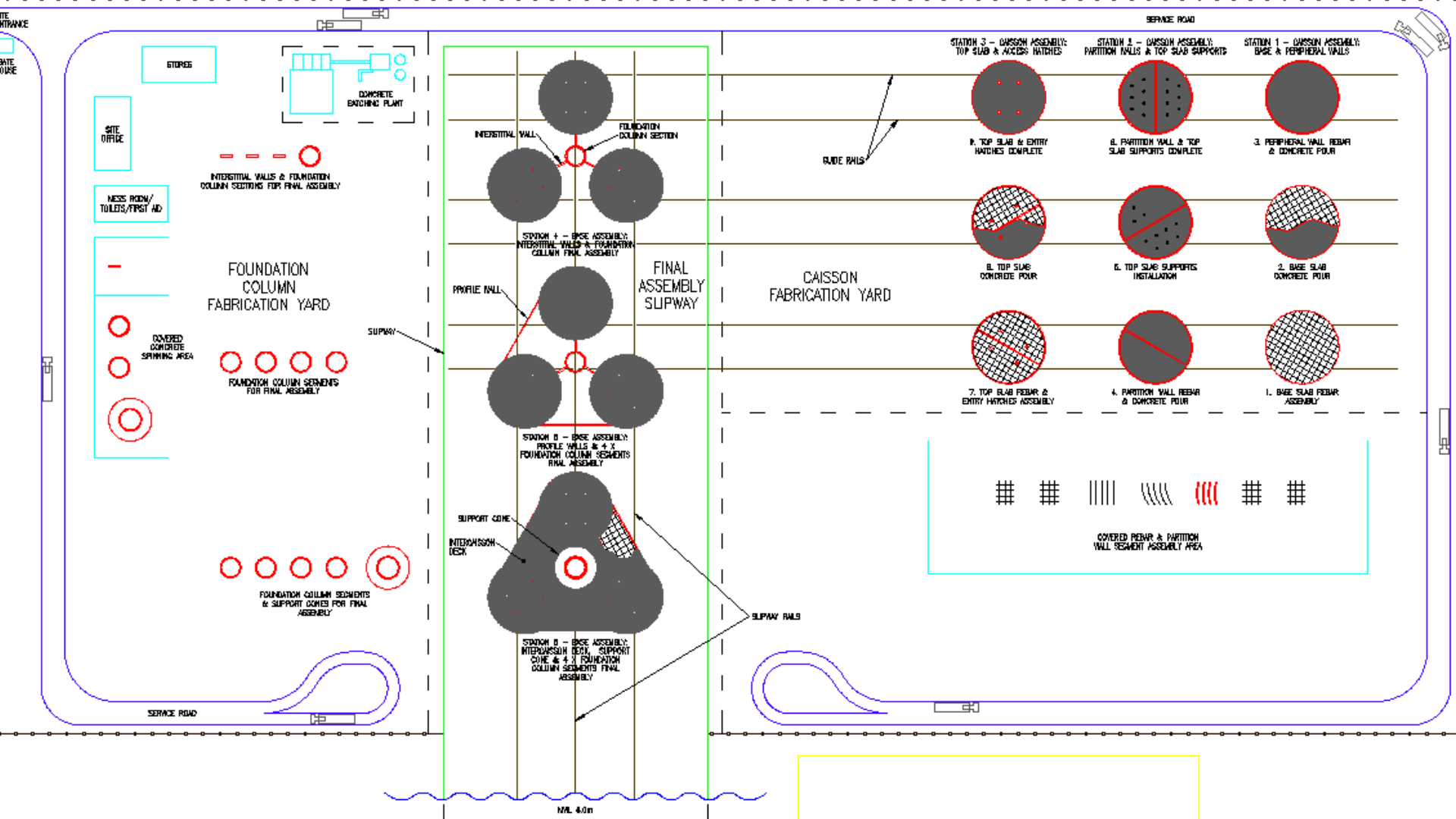
## Some Statistics

- Factory area - 500 m x 200 m
- WIP – 9 caissons plus 3 final assemblies
- Precast facility
- Over 11,000 tonnes concrete per week



# Foundation Factory

50m

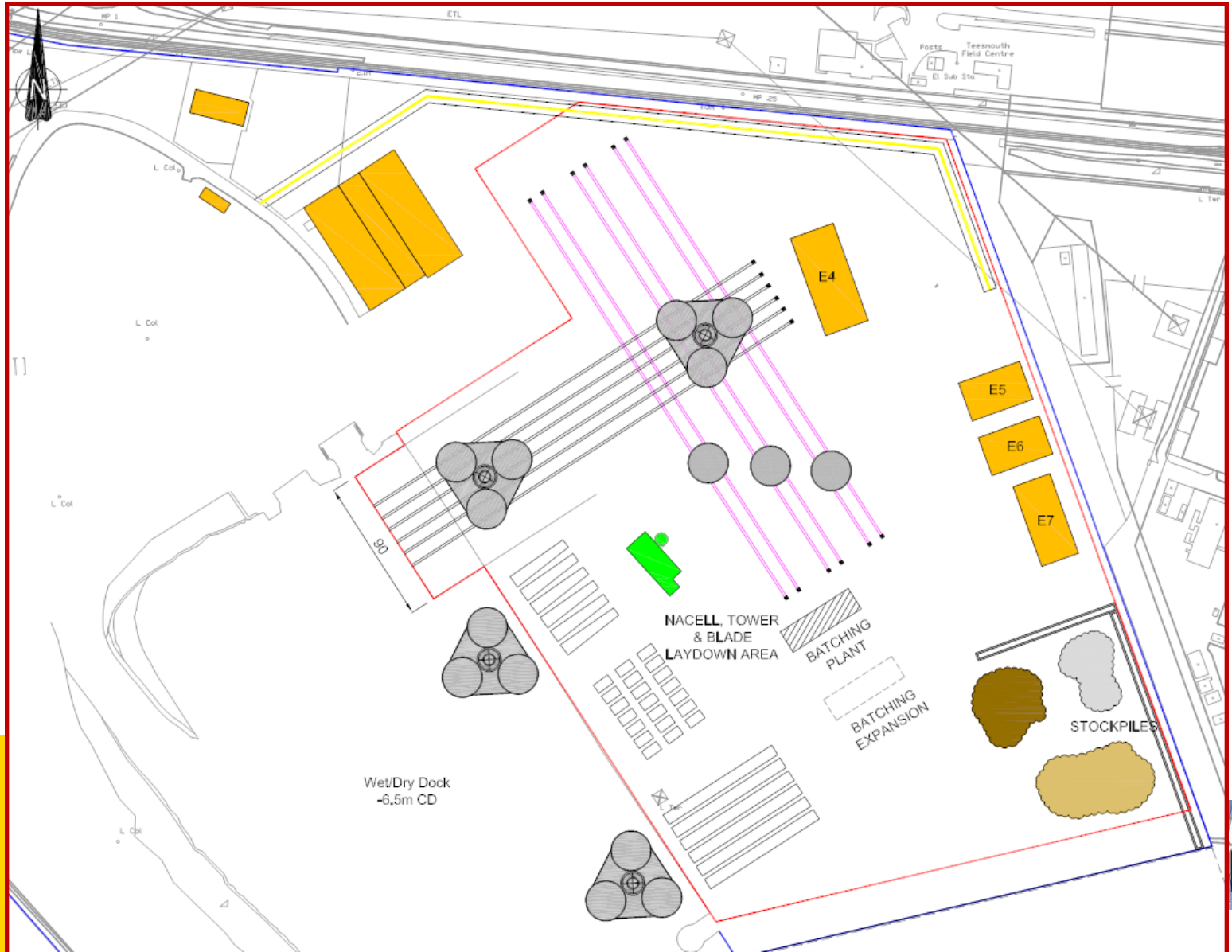


# Assembly Factory

- Environmental Assessment
- Terrestrial & Marine
- Ecology of the site
- Transport in and out
  - Components
  - Raw materials
  - Process waste



# Assembly Factory Draft Layout



# The Next Step

- Complete Foundation Manufacturing study
- Detailed costing for Foundations and Factory
- Assembly Factory final design and costing
- Model test design & build
- Model testing
- Reporting

£/MWH





## *Thanks to ...*

- NWIP for funding us
- The FASTWIND team
- Our audience today
- Hear more at

**13.45 – 15.00 Today**

**Research & Foundations : Session A**

