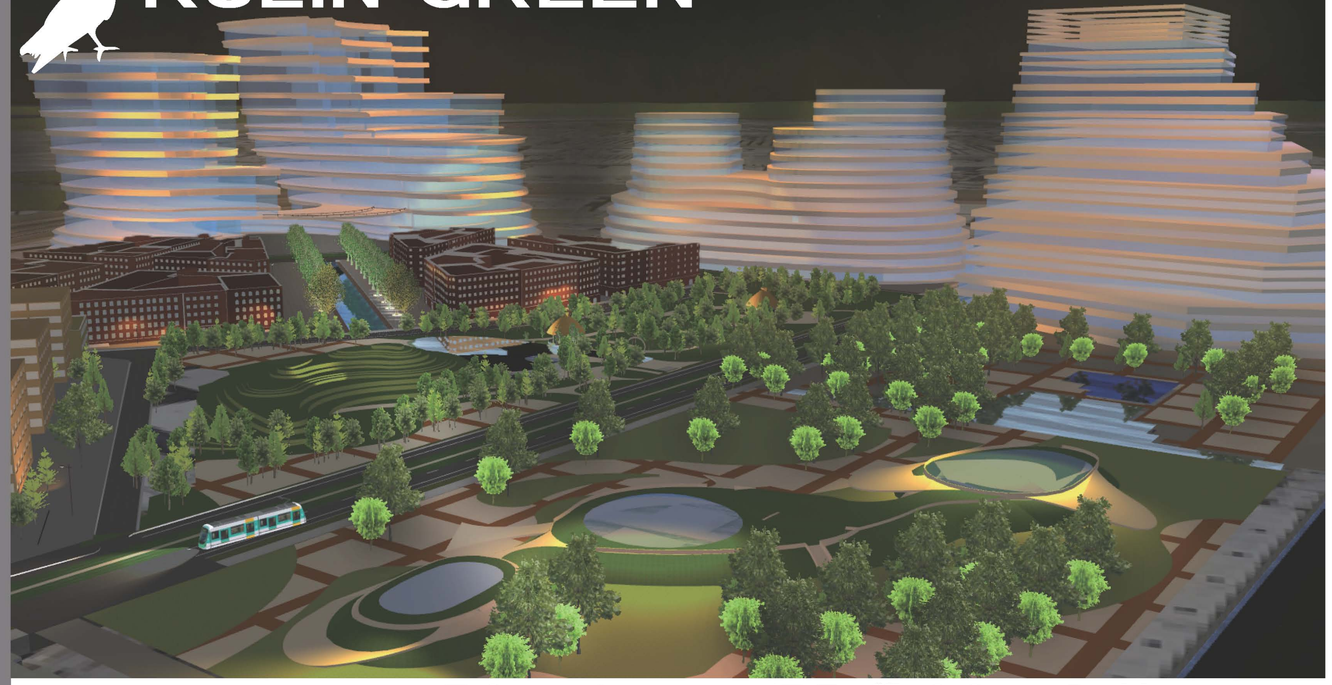
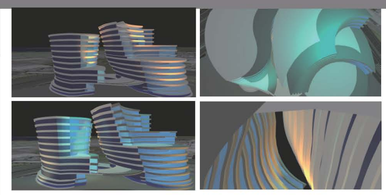
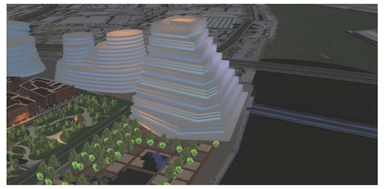
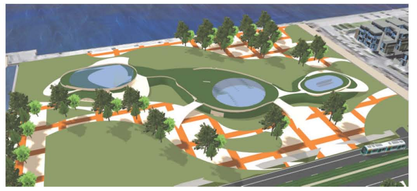
KULIN GREEN

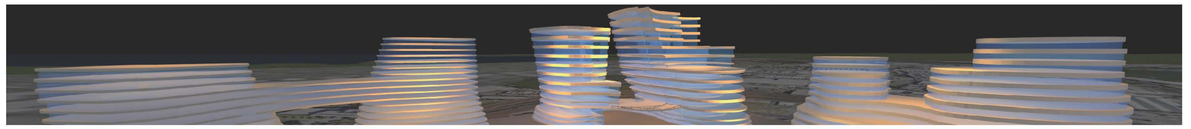
VDWC-Virtual Design World Cup The 5th Student BIM & VR Design Contest on Cloud Services
Theme 2016 "Extension of the central city Melbourne"



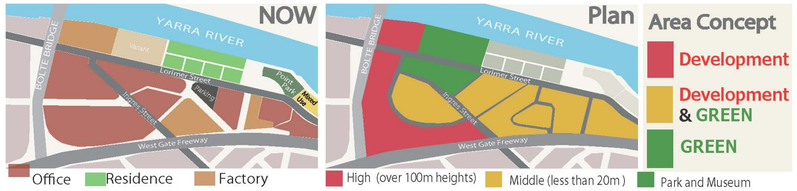








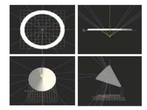
☐ Land Use Plan



☐ Time Change Visualization

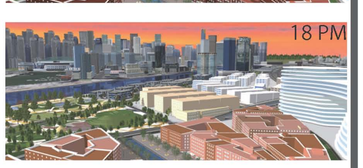
■ 1-day Time change

- Uc-win/road" can design the detail of light design.
- We designed night scene in Melbourne.
- So, we made to create 1-day time change in city.



$$L = \frac{B}{(Const + X_1 * D + X_2 * D^2)}$$

L: Luminance
B: Brightness
D: Distance
X_1: 1st parameter
X_2: 2st parameter



Time change

■ Years change

3D Tree

- Uc-win/road" can design yaear change.
- We aimed 3D Tree model in UC-win/road
- We simulated the landscape of road between trees.

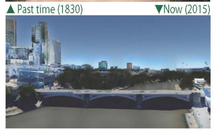
▲ Get back KULIN' S GREEN

☐ What' s KULIN ?

- Kulin people lived in Austrailia B.C 40,000 ago
- In 1830s, European people kept them away
- Kulin people loved and worship Nature
- There were many greens in Yarra river

▲ Past time (1830)

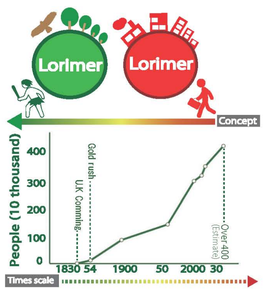
▼Now (2015)



▲ Kulin meets U.K ▼ Kulin people

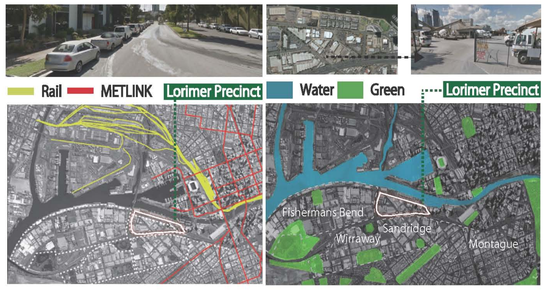
☐ Concept

- Against time, get back Kulin' s nature
- With "Wind Path", Bring wind to CBD
- Changing time scale, visualize green
- Green and Tram network extends to CBD

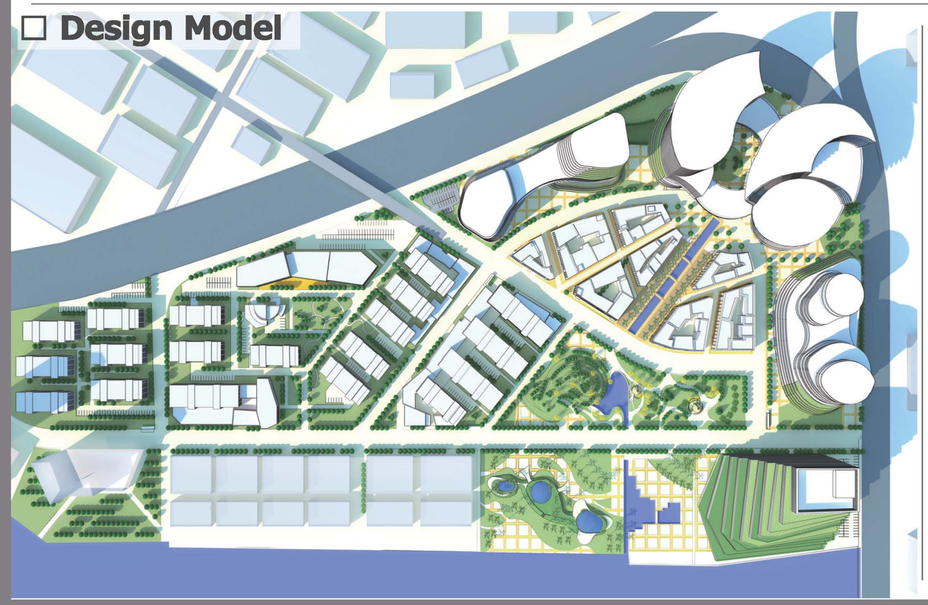


☐ Traffic & Green Problem

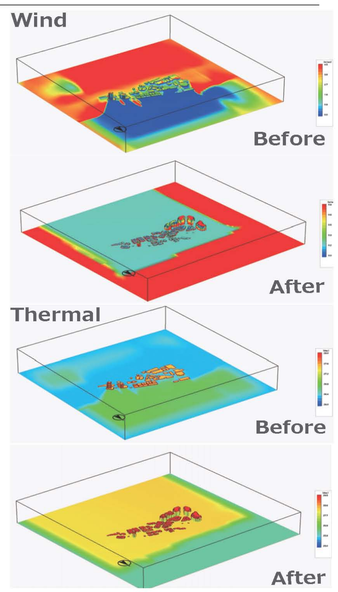
- There is no LR &T & train in Lorimer
- It's a inconvenient traffic situation
- It's desirable to stretch the LRT
- There are very few greens in Lorimer
- It needs to create & link much greens
- Linked greens will be habitat for nature



☐ Design Model



■ Wind and Thermal analysis on CFD



☐Wind & Heat Analysis

■ FLOW CHART

■ Table of indicators for wind & heat

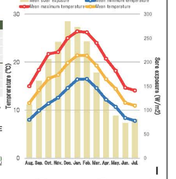
Wind and Thermal analysis conditions

	Items	Conditions
Weather	Date and time ※1	Jan. 21,2015-15pm
	Meteorological observatory	Melbourne(Olympic Park)
	Outside temperature(℃) ※2	26.4
	Solar exposure(W/m²) ※3	273.1
	Wind direction ※4	SSW
	Set wind velocity(m/sec) ※5	4.2
Analysis conditions	Roughness classification	Roughness classification Ⅱ (Before) Roughness classification Ⅳ (After)
	Analysis range(m)	1450 × 950 × 130 (Before) 1450 × 950 × 130 (After)
	Advection term difference scheme	Primary upwind difference
	Turbulence model	Standard k- ε model
	The number of grid	10,000,000
	Discretization	Finite volume method
	Velocity distribution	Exponential value
	Exponential value	0.35

Wind-fluid analysis conditions

	Items	Conditions
Weather	Wind direction ※4	SSW
	Initial and inflow wind velocity(m/sec) ※6	4.0
	Initial pressure(Pa) ※6	Constant(At absolute pressure 0
	Outflow pressure(Pa) ※6	The same as the initial value
Analysis conditions	Analysis range(m) ※6	2570 × 2300 × 320
	Mesh(m) ※6	X × 3X : mesh
	Boundary condition p ※6	Constant absolute pressure 0
	Turbulence model ※6	Smagorinsky model

※1 : Decided its statistically. Here is a possibility that similar to the date and time in the conditions
※2 : In 3 years (Aug/2013 - Sep/2016) set to the average maximum temperature
of the 3 year average maximum temperature that this high month (Jan)
※3 : In 3 years (Aug/2013 - Sep/2016) set to the average amount of solar radiation
in the 3 years of the average maximum temperature is the No.1 high month (Jan)
※4 : Mean wind direction at 15pm in the 3 months(Dec/2015,Jan/2016,Feb/2016)
※5 : Mean wind velocity at 15pm in the 3 months(Dec/2015,Jan/2016,Feb/2016)
※6 : FORUM3 goes specified value.
Melbourne wind direction at 15pm (Dec/2015,Jan/2016,Feb/2016)
In formulation source:<http://www.bom.gov.au/vic/forecasts/melbourne.shtml>



■ Wind path analysis on UC-Win/Road (Analysis software: Open form)

▲ Wind around high bulidings ▼ Our plan 3 wind pathes go to CBD