

The Electric Driverless Loop

Vision

Our vision is to take passengers out of congestion and place them 30m in the air, forever revolutionising transport

The Problem

‘Traffic congestion is expected to cost the national economy \$53 billion in lost productivity a year by 2031,’ according to former transport spokesman, Anthony Albanese.

- 1) Parramatta is a growing CBD, its popularity bringing with it more congestion
 - as of 2016, there is an estimated 25,800 people living in Parramatta, a number that is rapidly increasing, set to skyrocket at 150% (Daily Telegraph)
 - people of Parramatta sit in estimated 33 mins of traffic per day, 13.8 mins in the morning, 19.2 mins in the afternoon (Daily Telegraph)
- 2) Automobile/noise pollution contribute greatly to the environment and people’s health
 - Pollution is linked to an estimated 3000 deaths annually (the Australian Institute of Health and Welfare)
 - Excessive noise causes stress and fatigue leading to more serious issues such as cardiovascular disease (The Australian Academy of Science)

Opportunity

The opportunity arises to provide people with transport that reduces congestion, air and noise pollution. This specifically targets commuters/students taking much too long travelling short distances to school/work.

- By focusing on one suburb, Parramatta, delays and construction elsewhere won’t affect travel time
- It runs in the air, without disturbing existing infrastructure on ground levels and underground

Solution/Product

We have designed the EDL, Electric Driverless Loop. This is a figure-eight-loop railway track suspended by sets of poles on either side, in a triangular formation for maximum strength. The track was designed as a loop so that excessive time wasn’t wasted on terminating carriages. Five carriages (200 people per carriage) on top of the rail travel in one direction while five underneath travel in the opposite direction. Constructing a track on the ground would only cause more traffic as more space would be taken up.

- The top speed of the Sydney Metro is 100km/hr, so to ensure stability but still maintaining efficiency, the EDL will run at 80 km/hr.
- The route is around 11.45km long by calculating distances from each station (e.g. Parramatta Westfield to Parramatta West Public School is around 1.5km)
 - ➔ adding travelling times and time stopping at each station, for one carriage to complete the loop would take approximately 21 mins, more than half the time taken by car
 - ➔ less than a 5 minute wait time at each station and about 5-6 mins between each station, means highly efficient travel
- An elevator travels to two platforms, which are fenced by reinforced glass panels.
 - ➔ To reduce congestion in the elevator and for fire safety, stairs are built adjacent
- There have been 290 incidents of people falling through the gap between trains and platforms in the last year, so we have designed a retractable fenced ramp to come in place when the carriage arrives to prevent this
- This lets people passing through Parramatta or travelling out of the suburb take public transport/their cars; people travelling short distances within Parramatta can take the EDL

Contact Information

James Ruse
Agricultural High School

School Year

Year 8

Subject/s

STEM, Geography

Development Stage

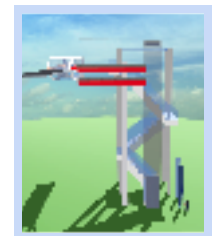
Revenue

Number of Team Members

5

The Team

Eva - Artistic director
Shania - Facilitator
Emily - Scribe
Clara - Researcher
Kirsten - Mediator



Technology

Resources that are needed to construct the EDL are easily accessible.

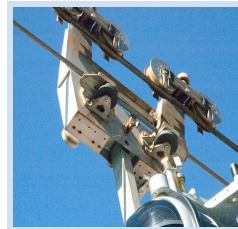
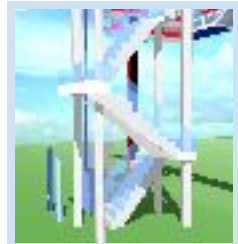
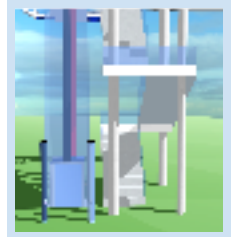
- Each tram weighs about 25 tonnes including the capacity of people boarding the tram.
 - It is crucial that we use lightweight materials such as aluminium for the construction of the trams as the concrete and steel has to hold up the carriage and support it
- The mechanisms that attach the bottom trams to the rail will be similar to that of the spring loaded grips used for gondola ski lifts, allowing smooth transit from each station
- An autonomous driving system will be used similar to the North West Sydney Metro.
 - In a 2011 study, 24,000 people were injured due to bus accidents and the leading cause was human error
 - Because of these horrifying statistics, an autonomous driving mechanism is necessary to ensure passengers' safety

Sustainability

Sustainable Sydney 2030 is a set of goals for our city to help make it as green, global and connected as possible by 2030. By having the EDL we are reinforcing this masterplan.

- The EDL runs on bought green electricity, utilising energy from solar panels on top of the train, to power other parts of it like lighting. This means less gas emissions.
- Moreover, it is constructed using renewable materials such as the carriage body frame, made from an alloy containing aluminium and stainless steel, which is recyclable

Yet



Investment Required

The EDL requires a partnership between the government and private industries. The cost will be similar to that of the Sydney metro. However, there is no need for excavation funds and the route is much shorter as it only focuses on one suburb which more than halves the cost, making it financially sustainable as well.

Prototype

- Feedback from classmates mentioned that roads to schools are often congested as well as Sydney train and bus services are often unreliable and can be delayed.

Using the street view feature on Google Maps, we have placed the stops (red circles) in strategic places where houses would not be removed or near an important hotspot (e.g. Parramatta Westfield).

This is the original prototype of our loop as from a bird's eye view.

- If the EDL successfully reduces congestion, there are opportunities to enforce a 'stage 2' plan which includes a walkway made of solar panels, restaurants and cafes, much like the New York highline

