Memorial Park Video Answers

Wednesday 20 November

1. Challenges in the Ground

Get your safety gear on and join Emma Beech, a Geotechnical Engineer in the trench to find out about some of the construction challenges.

1. Why is it important to know about the soil types under the ground?
   - Because different soils have different strengths
2. How do engineers know about different soil layers?
   - They drill bore holes and complete tests to test the strength of different soils
3. How does ground water affect construction?
   - It affects how deep construction needs to go to and whether water needs to be pumped out.

Next step learning: How do you think modern technology helps to overcome construction challenges and can you give any examples?

2. Designing Retaining Walls

Look up at the trench walls and see how they have been designed to stay strong and support the trench.

1. What two main things needed to be considered when designing the retaining walls?
   - The strength of the ground and the ground water level
2. What happens if the ground water level drops?
   - It can cause the ground to dry out, crack and settle causing damage to nearby buildings
3. What are the two designs and why are they needed?
   - Steel and wood walls (king posts with timber lagging) and full interlocking steel sheet posts where water needs to be contained.

Next step learning: Find a retaining wall near you and see how it has been built.

3. Shifting Services

Meet Site Engineer Tom Knight and see how services are shifted out of the way to make way for construction.

1. What services need to be moved?
   - Electricity, gas, water, sewage, telecommunications
2. How are these services moved?
   - They can be carefully dug up or a hydrovac machine uses water to expose pipes
3. Are there any services that have not been moved?
   - Yes, the 100 year old brick sewer has not been moved

Next step learning: How do you think the engineers know where the services are under the ground?

4. Building a Strong Wall

Walk down to the other end of the trench and see how the retaining wall has been built.

1. Where did the excavation start?
   - At the western end digging out to the lowest point in the middle
2. Why is this temporary wall needed?
   - To hold the trench walls in place and keep workers safe
3. How will the tunnel be anchored down?
   - 30 metre piles are drilled to anchor the tunnel to the bedrock

Next step learning: Make a model of the underpass and Memorial Park.

5. Digging the Trench

Watch the excavating of the trench and find out more about how much material has been removed from the area.

1. What was done before the excavating started?
   - King posts were driven into the ground for the retaining wall
2. How many truck and trailer loads of earth were removed and how long has this taken?
   - 2,700 truck and trailer loads in 5 months
3. How will water be drained from the tunnel?
   - It will collect at the lowest point where it will be piped off site

Next step learning: Find out where else cut and cover tunnels have been constructed in New Zealand.