

# Seaview Sea-level “Sea-narios”

*“Sea” if you can outlast sea-level rise in Seaview!*



**By: Julia Cuednet, Andrew Hunt, Nicole Kring, Nina Taurich**  
**Advisors: Leslie Dodson and Gary Pollice**





**Acknowledgements:** This game was adapted from Red Cross/Red Crescent Climate Centre's game "Act to Adapt." See the database of climate games at: <https://www.climatecentre.org/resources-games/games/6/act-to-adapt>

**Description:** Each player is a business community member (BCM) with 'assets' that are critical to running their business. Each round, the business community must decide collectively which vulnerable assets to prioritize in the event of a 'flood hazard scenario.' These 'assets' are split into two categories: personal and communal. Players must invest in the protection of personal assets, as well as invest their tokens as a group into the community assets. If these assets are damaged by the 'flood hazard scenario' and not protected by investment, the BCM will take a hit by losing 'tokens.' Damage to critical assets results in a higher token cost if damaged. The goal of the game is to end the scenarios with the most amount of tokens.

**Learning Outcomes:** To experience the impact of flooding and sea-level rise in Seaview; to explore what infrastructure is vulnerable to which types of flooding; to recognize the importance and urgency of proactive planning in the context of climate change uncertainty; to recognize the importance of business interconnectivity as the players must work together to succeed

**Intended Audience:** Business leaders in the Seaview Gracefield area

**Number of Players:** Small groups of 3-5 players with one facilitator.  
In the event of more than 5 players, the separate business communities (group of players) are competing against one another to keep the most BCMs in the game.

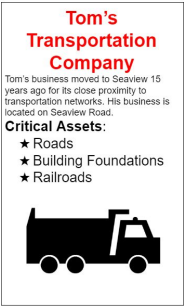
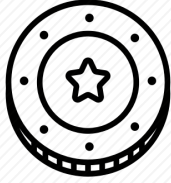

**Time Needed:** 30-45 minutes


**Playspace Requirements:** a large space, big enough for all participants

**Materials:**

- Tokens
- BCM cards
- Flood Hazard Scenario Cards
- Asset Cards

## Key Components of Game:

Component	Number per Group	Types	Purpose
Business Community Member (BCM) Cards	5 	(See BCM card table)	Lists three unique “assets” that are critical to running that business. One critical personal asset and two public assets
Token	15 x number of players 	All value of 1 unit	A ‘token’ represents a business’s resources to invest in planning against the effects of a flooding hazard’. If a BCM’s asset is damaged by a ‘flood hazard scenario’, tokens are taken away unless the asset had investments.
Asset Cards	9 	Personal <ul style="list-style-type: none"> <li>• Drinking water</li> <li>• Ground-level building</li> <li>• Foundation</li> </ul> Communal/Public <ul style="list-style-type: none"> <li>• Underground Gas Pipes</li> <li>• Bridges</li> <li>• Underground Cables</li> <li>• Sewage System</li> <li>• Railroads</li> <li>• Roads</li> </ul>	These cards identify specific assets that exist within the community that can be damaged by the flooding events.

Flood Hazard Scenarios/ Rounds	3 rounds in total	(See Gameplay Scenarios)	Each round presents a different flood hazard resulting in different assets being affected.
Flood Hazard Cards	<p>8</p>  <p>Stormwater Drainage Blockage</p> <ul style="list-style-type: none"> <li>Storm drains can be blocked overtime by dirt, trees, silt, and rubbish</li> <li>Pipes can become cracked</li> </ul> <p>Intensity: <span style="display: inline-block; width: 20px; height: 10px; background-color: yellow; border: 1px solid black;"></span> <span style="display: inline-block; width: 20px; height: 10px; background-color: white; border: 1px solid black;"></span> <span style="display: inline-block; width: 20px; height: 10px; background-color: white; border: 1px solid black;"></span> <span style="display: inline-block; width: 20px; height: 10px; background-color: white; border: 1px solid black;"></span></p>	<ul style="list-style-type: none"> <li>Storm Surges</li> <li>Overtopping of Waiwhetu</li> <li>Groundwater Inundation</li> <li>Stormwater drainage blockage</li> </ul>	Represents the different types of flood events.
Timeline of the Game	NA	NA	This game has a timeline of 20 years starting in 2020, with the second round in 2030, and final round in 2040.

## Setting up the Game:

- 1) Divide the players into small groups of 3-5, allowing for one facilitator to be with each group.
- 2) Give each player a BCM card.
- 3) Give each player 15 tokens.

## Playing the Game:

### Rules:

- Each player can use a max of 3 tokens per round to invest in infrastructure
- Players can invest in their own personal assets or public assets
- It takes 1 token to protect a players personal assets and 1x (the number of players) to protect a public asset
- An asset is damaged if it is listed as being affected and doesn't have enough tokens
- If a asset is damaged each player must give four tokens for each a critical asset damaged and two tokens for each regular asset damaged
- If an affected asset was prioritized by the community (had enough tokens) 1x(the number of payers) tokens are removed
- If an affected asset was damaged due to not enough tokens the tokens remain
- Tokens on unaffected assets remain on the board

### Prior to the First Round:

- 1) Each player chooses a business community member card
- 2) Each player is given 15 tokens
- 3) Each player is given their three critical asset cards
- 4) Players are introduced to the communal asset cards
- 5) Read the introduction script

### Round 1:

- 1) Present and explain the first flood scenario by reading the script. Place down the relevant flood hazard cards for that scenario. Explain the types of flooding and how this is a realistic and current flood scenario for Seaview. The purpose is for them to decide which assets they think are most vulnerable to this flooding based on their understanding of the scenario.
- 2) Each player must decide how they will divide their three tokens up each round. Players must discuss why they believe certain infrastructure will get affected and try to convince the group to pool their tokens to protect an asset. Give each group 2 minutes to discuss and invest.

- 3) Explain the outcome/effects of the scenario. For each asset damaged, a certain amount of tokens are taken away from each BCM. More are taken away from them if it is listed as a critical asset for them. If it is protected, however, no tokens are taken away but tokens are removed from the asset. When all tokens of a BCM are lost, that player is eliminated from the game.
- 4) Debrief after each round/ flood hazard scenario:
  - a) What assets did they choose correctly to prioritize, why?
  - b) What assets did they not choose correctly to prioritize, why?

### **Round 2:**

- 1) Preface this round with an explanation of climate change and sea-level rise. As these increase, coastal hazards worsen. Therefore, each round will have more severe flood hazard scenarios.
- 2) Explain that 10 years have passed since the last flood hazard scenario and explain the next scenario
- 3) Insurance Premiums Increase: Insurance companies realize the area is at risk and check businesses preparedness. For each personal asset not being invested in the player loses one token to pay for the increase in insurance premiums.
- 4) Repeat steps 2-4 of Round 1 for this flood hazard scenario.

### **Round 3:**

- 1) (See instructions for Round 2)
- 2) If there is more than one group present, count the remaining BCM left. Whichever group with the most BCMs left wins.

## **Debrief after the game:**

- Did you learn new information about the types of floods in Seaview?
- Did any misconceptions about flooding you have surface after playing this game?
- Was it difficult to figure out which assets should be prioritized?
- Was it difficult to come to a decision collectively?
- How did your team strategize choosing which assets to prioritize?
- Did working together increase the chances of everyone's success?

# **Flood Hazard Scenarios/ Rounds:**

## **Introduction Script:**

You are all business community members of Seaview Gracefield. Each business card given to you has a brief description of the business and its location. In addition, each business has a list of three critical assets to them, which are crucial to your business's day to day function. Being in an area vulnerable to flooding, you are aware that these assets may have the potential to be affected by flood events. Each business owner is allocated 15 tokens. These tokens represent resources used to invest in protecting personal and communal assets.

The game will consist of three rounds. The first round is the current day, the second is 2030, and the third is 2040. In each of these rounds, a flooding event will occur. As a business owner and community member, you must decide what assets to be invested in. There are three assets labeled as personal assets. These are drinking water, building foundations, and ground-level buildings. The rest of the assets are considered to be communal. After each scenario, each business owner may use a maximum of three tokens to invest in these assets. To protect a personal asset you must personally have one token invested in the asset that you would like to protect. To protect a communal asset, there must be the same number of tokens on the asset as there are players.

After each scenario, the facilitator will tell the group what assets have been affected by the flooding hazard. If the asset was protected, the tokens invested on that asset will go to upkeep of that asset. If the asset has been affected by the flooding but was not invested in, each player will use two tokens to repair that asset. If this asset is a critical asset to your business, you will use four instead. The goal of the game is to end the scenarios with the most amount of tokens. Remember that relationships and interconnectivity may play a crucial role in managing your own resources.

## **Round 1 (2020)**

A large southerly storm is occurring in Seaview. This storm brought very severe winds but not a large volume of rain. The wind in addition to the high tide has led to waves crashing over the coastline and washing on to the roads.

### Effects:

Roads were affected. The waves were coming far enough to cause a severe safety hazard for driving. Due to this, your workers were unable to drive to work today.

Buildings that were not raised were slightly flooded, damaging equipment kept on the first floor.

## **Round 2 (2030)**

Sea level has risen around 0.12m. The result of frequent heavy rainfall over the course of a month has led to the Waiwhetu rising and causing minor floods throughout the month. This time the heavy rainfall occurred at the same time as a king tide causing the Waiwhetu to completely overtop. This flood is a 1 in 40-year flood. In addition to this king tide, the SLR has caused the water table to rise, there is very little space in the soil for the absorption of the rain and river water that has overtopped the river banks.

### Effects:

Roads were affected again. This flood has made it a hazard to drive along many of the roads in Seaview. You and your workers were unable to make it into work for multiple days.

Buildings that were not raised were flooded causing damages to anything kept on the bottom floor.

This storm halted railway transportation for the day.

## **Round 3 (2040)**

The sea level has risen by 0.24m. As the SLR has risen the high tides have become higher. Due to this the water level is closer to breaching over the coast as well as the Waiwhetu. A 1 in 20-year storm event comes from the south with severe winds. The brunt of this storm hit during high tide causing a severe storm surge. In addition to this, the intensity of the rainfall has caused the Waiwhetu stream to simultaneously flood during this storm surge event. The heavy winds are causing debris to get caught in the storm drains causing a severe blockage. In addition to this, the water table has risen even higher and is starting to have more long term effects.

### Effects:

Your building foundation was found to be heavily damaged and eroded due to the rising of seawater in the ground. Before your building can continue to be used the damage must be fixed.

Additionally, groundwater inundation has led to the damage of your building's gas pipes, and if not protected some cracks in your sewage system have led to the contamination of drinking water. The stormwater drains along the coast have all been blocked by debris causing there to be more than half a meter of water on the roads. This makes the roads completely unusable for multiple days as work is done to try and clean.



This also led to the severe flooding of buildings damaging entire floors.

Gameplay Materials:

Stormwater Drainage Blockage



- Storm drains can be blocked overtime by dirt, trees, silt, and rubbish.
- Pipes can become cracked

Intensity:			
------------	--	--	--

Stormwater Drainage Blockage



- Storm drains can be blocked overtime by dirt, trees, silt, and rubbish.
- Pipes can become cracked

Intensity:			
------------	--	--	--

# Overtopping of the Waiwhetu Stream

Overtopping is the process of floodwaters flowing over the top of stopbanks.

## 1-in-40 year flood

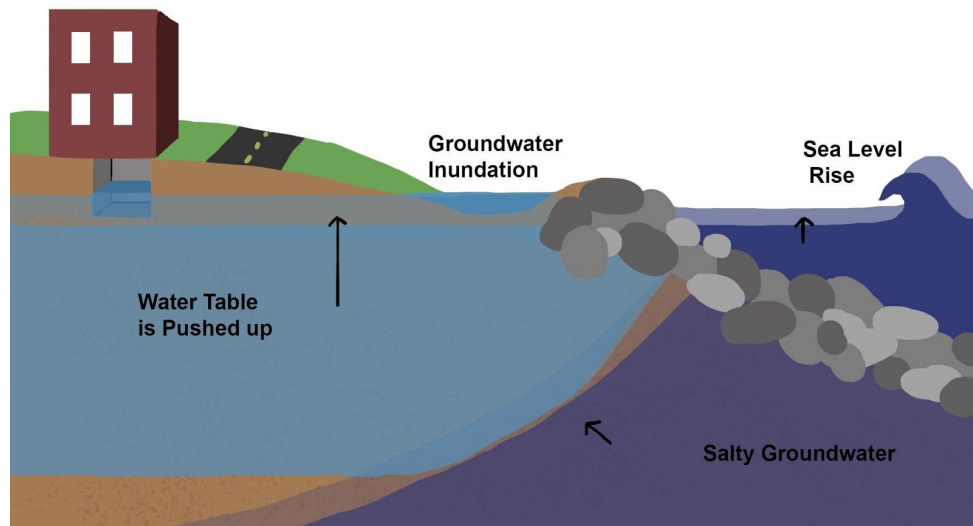


## 1-in-100 year flood



SLR	Wellington
0cm	Every 100 years
10cm	Every 20 years
20cm	Every 4 years
30cm	Once a year
40cm	Every 2 months
50cm	Twice a month
60cm	3 times a week
70cm	Every tide
80cm	Every tide
90cm	Every tide
100cm	Every tide

## Groundwater Inundation

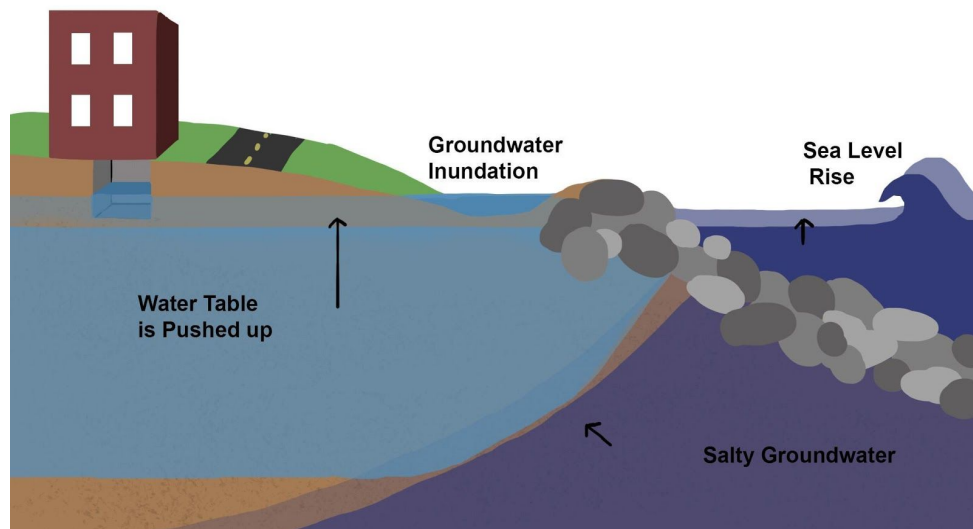


As the sea-level rises, it pushes up the freshwater table causing flooding.

**Intensity:**

## Groundwater Inundation



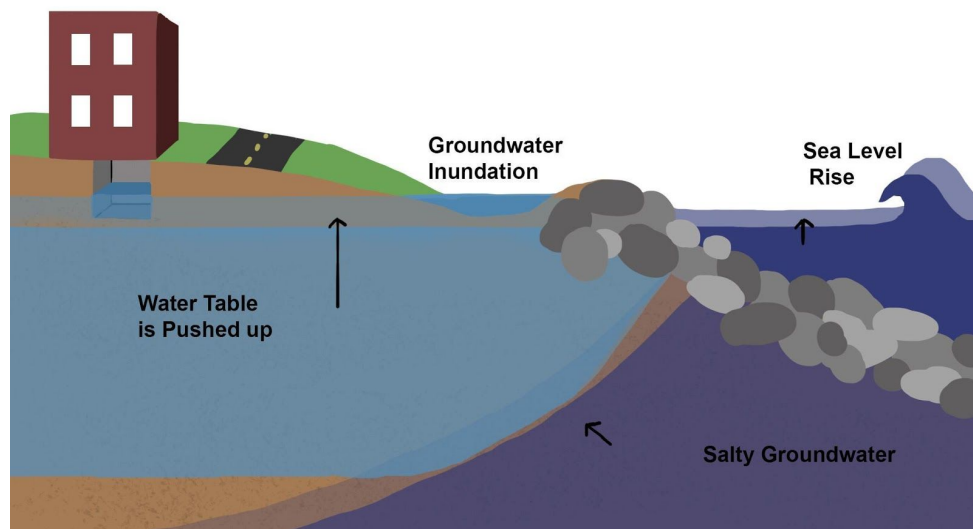


As the sea-level rises, it pushes up the freshwater table causing flooding.

**Intensity:**



## Groundwater Inundation



As the sea-level rises, it pushes up the freshwater table causing flooding.

**Intensity:**



# Stormwater Drainage Blockage

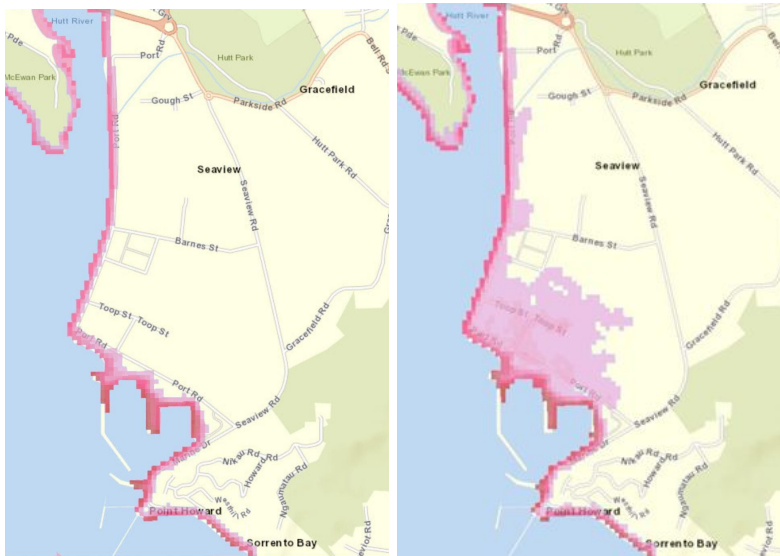


- Storm drains can be blocked overtime by: dirt, trees, silt, and rubbish.
- Pipes can become cracked

Intensity:



# Storm Surges



Storm surges cause a rising of the sea as a result of wind and atmospheric pressure changes during a storm.

- Causes erosion along the coast

- Debris washes up along the coast
- Waves crash over coastal barriers



## Tracy's Transportation Company

Tom's business moved to Seaview 15 years ago for its close proximity to transportation networks. His business is located on Seaview Road and transports car parts.

### **Critical Assets:**

- ★ Roads
- ★ Building foundations
- ★ Railroads

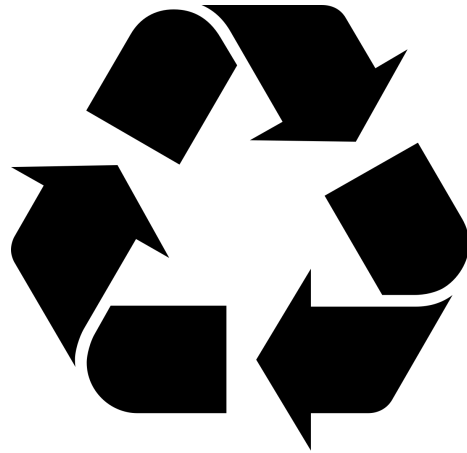


## Ryan's Recycling

Ryan's business, located on Barnes Street, has been in the area for 10 years. It is a large company and currently has business continuity planning in place regarding sea-level rise.

### **Critical Assets:**

- ★ Gas lines
- ★ Cables
- ★ Building Foundations



## Emily's Engineering Company

Emily's business moved to Seaview just two years ago and she is located on Port Road. Her business is making strides towards being able to work remotely.

### **Critical Assets:**

- ★ Ground-level floor
- ★ Roads
- ★ Bridges



## Arthur's Auto Body Shop

Arthur's Auto Body Shop has been in Seaview for 20 years and they have a loyal clientele, local to the area. He is located on Port Road.

### **Critical Assets:**

- ★ Ground-level floor
- ★ Cables
- ★ Roads



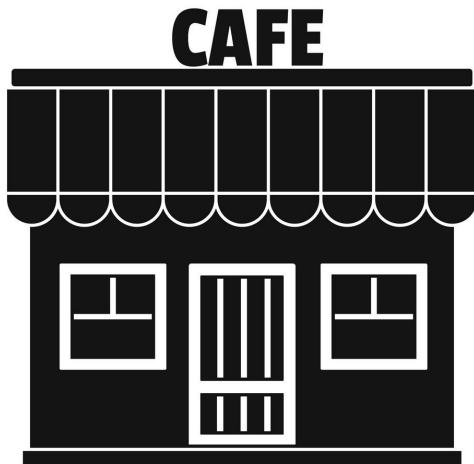


## Chris' Cafe

Claire's Cafe feeds many of the business owners in Seaview as well as visitors coming in and out of the area. The cafe is located along the Waiwhetu stream. She moved to the area right before the major flooding of the stream in 2004.

### **Critical Assets:**

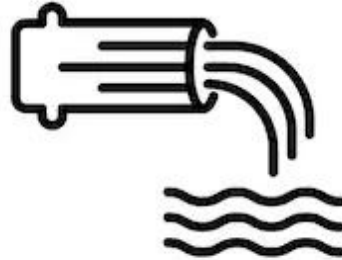
- ★ Drinking water
- ★ Sewage system
- ★ Gas lines



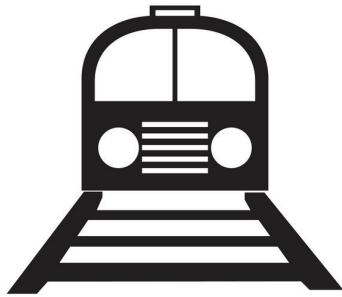
## Drinking-water



## Sewage System



## Railroads



## Bridges



## Roads



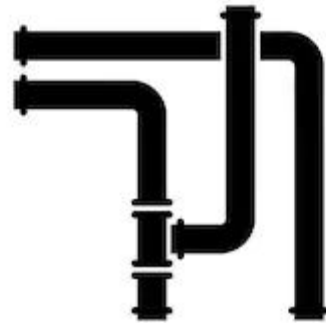
## Building Foundations



## Ground-level of Building

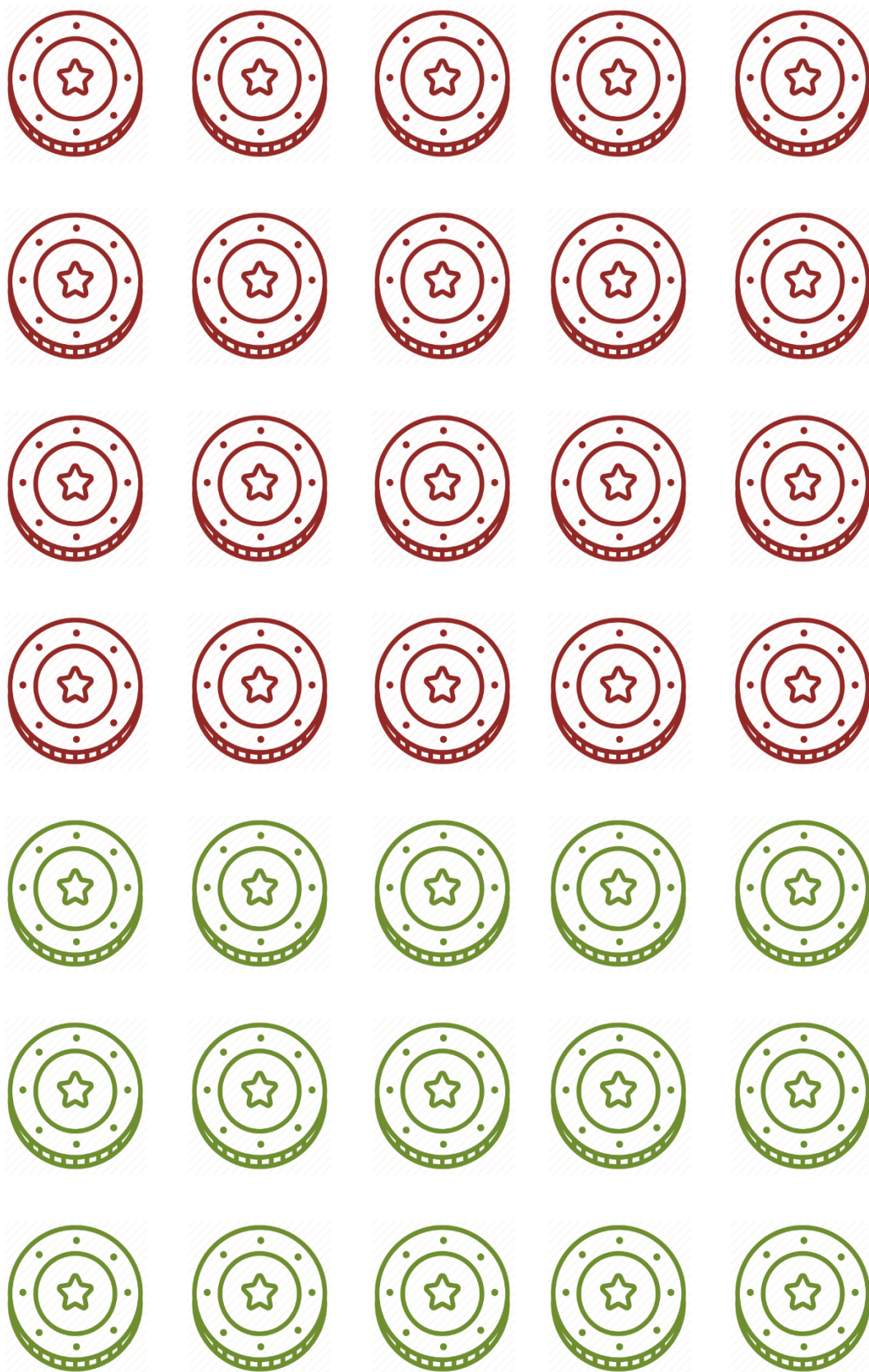


## Underground Gas Pipes

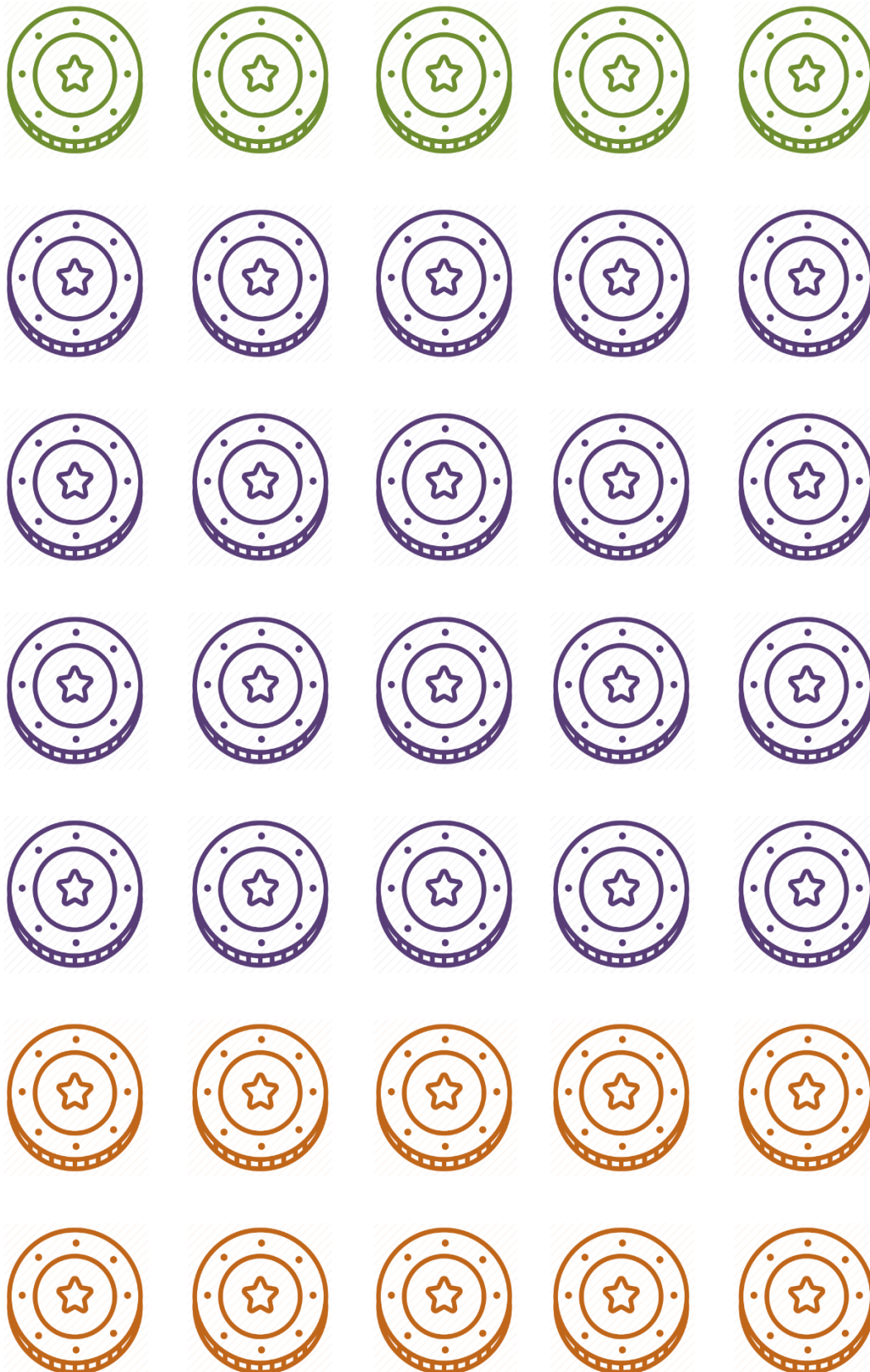


## Underground Cables





Seaview Sea-level “Scenarios”



Seaview Sea-level “Scenarios”

