When Leah was getting ready for school, she saw an article about roads and parks flooding in a nearby area due to a lot of rain. She ate her breakfast while her mother looked at the forecast. "It says here the rain is finally going to let up," her mom said. "That's a good thing because the river has risen, and any more water might flood the whole area."

On the way to school, Leah and her mom had to slow down several times where dark water had flooded the road. The water ran fast over the pavement and then cut a gully in the land next to the street. Leah noticed that in the parts of the road that were no longer flooded, there was a lot of mud and debris left behind.

"Where did that mud come from? I wonder why the water looks cloudy?" she asked.

"I don't know," said her mother, "but a couple of days ago, I remember seeing people working on the school's lawns and playing fields, spreading something over them. Maybe that had something to do with all this mud."

• • •

Where did the mud come from? How was it transported to the road? Can water change the land? What kind of things can be in the water? How does water move around the planet?

To investigate these questions, you will construct explanations based on evidence for how geoscience processes have changed Earth's surface. In this unit, you will model how water cycles over and under the surface and through the air. You will have opportunities to apply scientific principles to design systems that can reduce the human impact on land and water.

New pboto to come

1 Where Should We Build?

INVESTIGATION

OVER THE PAST 20 years, the population of Boomtown has grown sharply, which has caused school overcrowding. Now the Boomtown City Council is trying to decide where to build a new school building. The Council is planning on including additional sports fields at the school for use by the whole community. Three possible locations for the new school and fields are being considered.

As more people live in and use the resources of an area, the natural characteristics of that area can change. More homes and businesses are built, more farms and gardens need fertilizer and water, and industries make more products to meet the population's needs. All of these activities use resources and create waste products. In this way, the effect on the environment caused by population growth can be significant. The effect on living organisms and their nonliving environment due to human activity is called **human impact.**

GUIDING QUESTION

What is the human impact of constructing buildings?

MATERIALS

For each student

Student Sheet 1.1, "Observations Before and After Construction"

PROCEDURE

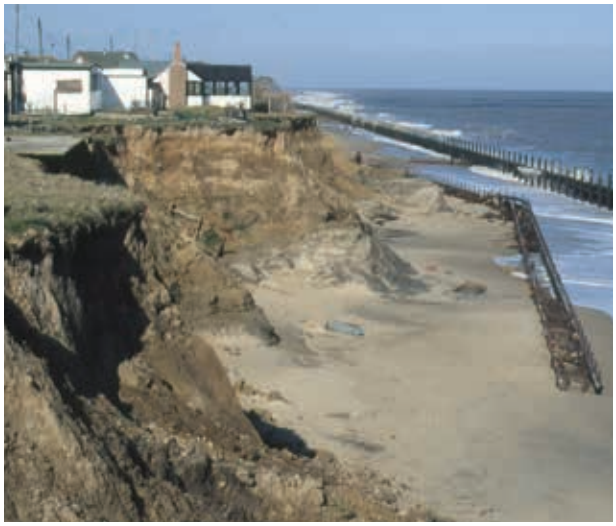
1. Each set of photographs on the next page shows places before and after the construction of buildings. Examine the photographs, one location at a time. Observe changes—before and after construction—in
   - the land.
   - the water.
   - the plants and animals.
2. Discuss the changes you observed with your partner. Then record your observations on Student Sheet 1.1, "Observations Before and After Construction."
3. After observing the photographs of all three kinds of places, discuss your ideas with the other pair in your group of four. Review the information in your table on Student Sheet 1.1 together, and then add any new observations of the three kinds of places.
4. The observations you made provide a type of **evidence**, or information that supports or refutes a claim. With your group, use the evidence you gathered to make a claim about the human impact of building in Boomtown.

ANALYSIS

1. Explain how each of the following kind of places could be changed by the construction of buildings due to increased population:
   a. wetlands
   b. hillside
   c. cliff

Building Sites Before and After Construction

Cliff before



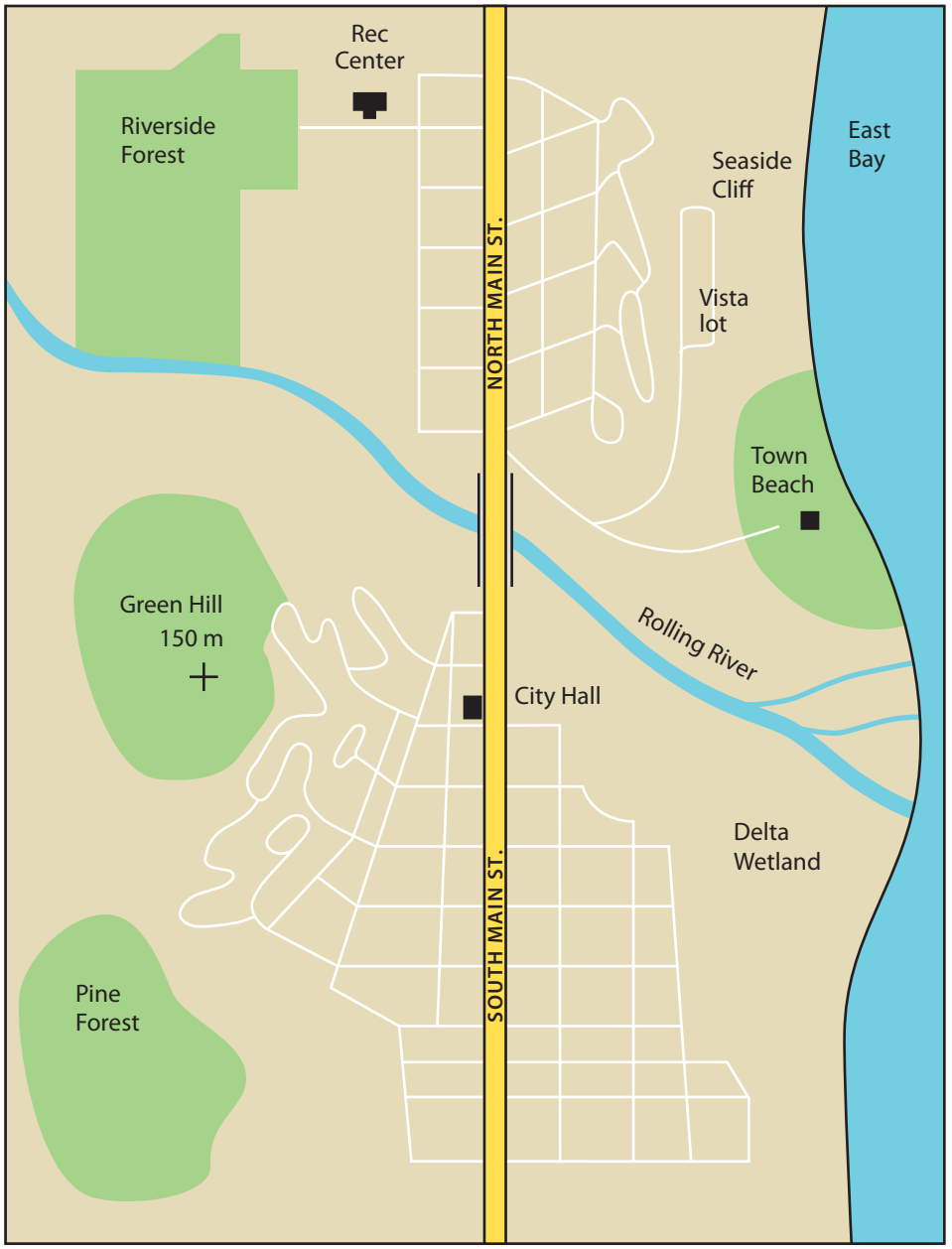
Cliff after

Hillside before

Hillside after

Wetlands before

Wetlands after


Rec Center
Riverside Forest
NORTH MAIN ST.
Seaside Cliff
East Bay
Vista lot
Town Beach
Green Hill
150 m
Rolling River
City Hall
Delta Wetland
SOUTH MAIN ST.
Pine Forest
KEY
Scale
0
200
Meters
N

2. A **trade-off** is a desirable outcome given up to gain another desirable outcome. What are some of the trade-offs involving the human impacts of building a new school and fields?

3. Examine the map of Boomtown below. Find each of the three sites being considered for the new school and fields:

   - Delta Wetlands
   - Green Hill
   - Seaside Cliff

   Based on what you know so far, on which site do you think Boomtown should build the new school? Use the map and observations from this activity to form your opinion.

<1.8 insert Boomtown Map street map here and label hill, cliff and wetlands. Like a google map. Same as Visual Aid 10.1, maybe subset of that map? >

4. Explain the questions you might have about the following, which could help the City Council decide where to build the new school:

   a. animals in the area
   b. plants in the area
   c. shape of the land
   d. health of nearby water

5. **Reflection:** Compare Boomtown to where you live. How is it similar or different?