



NO SUCH
PLACE AS
"AWAY"

TOUR
GUIDE



Name

Pinellas County Solid Waste

WELCOME TO Bridgeway Acres

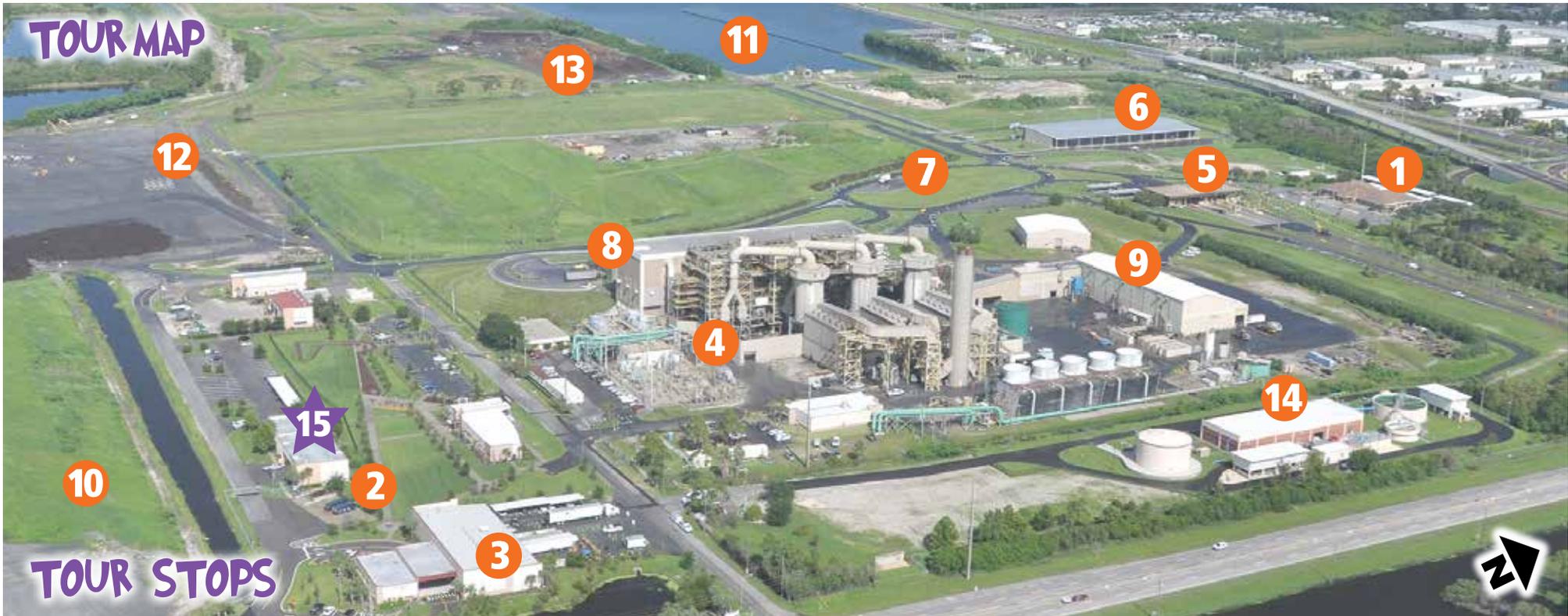
...the place your trash goes when you
throw it AWAY!

Today, you will tour the Bridgeway Acres facility where Pinellas County's *solid waste* (trash) is managed.



Your mission today is to:

- 1) See what happens to the *waste* you throw away.
- 2) Find out how you can make less waste with the "3Rs"—REDUCE, REUSE and RECYCLE.
- 3) Pledge to make good choices to help the environment!



TOUR MAP

TOUR STOPS

- | | | | |
|--------------------------------|-----------------|--------------------------|--|
| 1 Administration Building | 5 Scalehouse | 9 Ash & Metal Processing | 13 Yard Waste-to-Mulch |
| 2 Recycling Drop-Off | 6 Hand Unload | 10 South Landfill | 14 Industrial Water Treatment Facility |
| 3 HEC ₃ & Swap Shop | 7 Hot Pad | 11 Pond A | 15 WTE Training Room |
| 4 Waste-to-Energy Facility | 8 Tipping Floor | 12 West Landfill | |

1 Solid Waste

The "3Rs"

Pinellas is Florida's most densely populated county. Nearly one million residents, plus our visitors, generate approximately **1.5 million tons of trash** (*municipal solid waste*) per year. We need your help with the "3Rs" to create less trash.



Hierarchy for Solid Waste Management



- 1) *Reduce*
 - 2) *Reuse*
 - 3) *Recycle*
 - 4) *Waste-to-Energy (WTE)*
 - 5) *Sanitary Landfill*
- } = "3Rs"

Nearly one million tons of the county's **municipal solid waste** are processed at Bridgeway Acres—the facility you will see on this tour. The rest is recycled, or processed, by private construction and demolition *debris* facilities.

Factoid!

Pinellas County's recycling rate is over **30%**. We could recycle much more!



What are the "3Rs"?



Reduce = use less stuff!

- For example:
- ➡ Buy only what you need.
 - ➡ Avoid excess packaging (such as buying snacks in one large bag instead of many single-serving bags).
 - ➡ Steer clear of disposable items such as plastic cups or paper napkins.

Reuse = use stuff again!

- For example:
- ↻ Share or borrow rarely used items with friends or family.
 - ↻ Pack "low litter" lunches with reusable containers.
 - ↻ Repair a broken item instead of buying a new one.



Factoid!

There are **over 100 thrift stores and charities** in Pinellas County. Do you have clothes, toys, CDs, games or books that you could donate?



Recycle = use old stuff to make new stuff! For example:

- ♻️ Recycle cans, bottles and paper. Every neighborhood in the county has a recycling program available. Find out about your local program at pinellascounty.org/recycle.



The Nike Reuse-A-Shoe Program recycles worn out sneakers into rubber sports surfaces. It takes **75,000 pairs of sneakers to make a running track!**

Recycling Process



Our **recyclables** go to a separate facility to be sorted, baled and shipped to recyclers.

- **Recycling allows us to use materials again and again** instead of wasting them.
- Recycling saves energy, reduces pollution, preserves disposal capacity, and conserves natural resources such as trees and oil.

Factoid!

Many **paper products you buy for school** are available with recycled content. Check out the labels when you shop!

EXAMPLE:
notebook paper



Closing the Loop



- ♻️ **Collect** - Citizens separate **recyclable** materials from garbage for collection.
- ♻️ **Process** - Recyclers re-manufacture these materials into new products, which saves natural resources.
- ♻️ **Buy** - Consumers purchase the recycled products. This is called **closing the loop** because it completes the cycle.

- Is there a recycling program at your school?
- What items are collected?



2 Recycling Drop-Off



There are over **60 drop-off recycling centers** in our county.

- The **drop-off recycling centers** operated by Pinellas County collect:
 - ♻️ aluminum and steel cans
 - ♻️ plastics #1-7
 - ♻️ newspaper
 - ♻️ cardboard
 - ♻️ mixed paper
 - ♻️ glass bottles & jars

Factoid!

Aluminum cans are shredded into small metal "flakes", melted, rolled and cut into new cans. Amazingly, an aluminum can that's recycled today could be **back on store shelves** as a new can in **just 60 days!**



- Does your family use a **curbside recycling bin** or a **drop-off recycling center**?



Recycling Trash into Treasure

RECYCLE THIS TO MAKE THAT

- | | |
|------------------------------|----------------|
| Aluminum and steel cans..... | Bicycles |
| Cardboard | Cereal boxes |
| Mixed paper | Facial tissues |
| Newspaper | Egg cartons |
| Plastic soda bottles | Carpet |
| Plastic milk jugs | Park benches |



3 HEC₃ & Swap Shop

- **Hazardous waste** must be handled separately from other garbage to minimize the risk of pollution or injury.
- **Electronics** with hazardous components (such as cell phones, computers or video game players) must not be thrown in the trash.
- Hazardous **chemicals** (such as paint or pesticides) must not be poured down the drain, on the ground, or thrown in the trash.



The average TV or computer monitor contains five pounds of hazardous lead!



One resident painted her entire house with free paint from the Swap Shop!

- Household residents can drop off hazardous electronics and chemicals at the **Household Electronics and Chemical Collection Center (HEC₃)** or a **mobile collection** for free.
- Hazardous waste items will be processed for **recycling or safe disposal**, depending on the materials they contain.

Factoid!

Cell phones contain valuable metals that can be recycled. In fact, there is **enough gold in 200 cell phones to make a wedding ring!**



■ Did you know fluorescent light bulbs contain hazardous mercury and should be recycled?

4 Waste-to-Energy

- Our **Waste-to-Energy (WTE) Facility** converts **municipal solid waste** into electrical energy. The facility works like a power plant, except it **uses solid waste as fuel**. Heat from the burning garbage turns water in the boiler tubes into steam, which turns a **turbine** to generate electricity.
- The WTE Facility can process **950,000 tons of solid waste per year**, generating enough electricity to power up to 45,000 households every day.

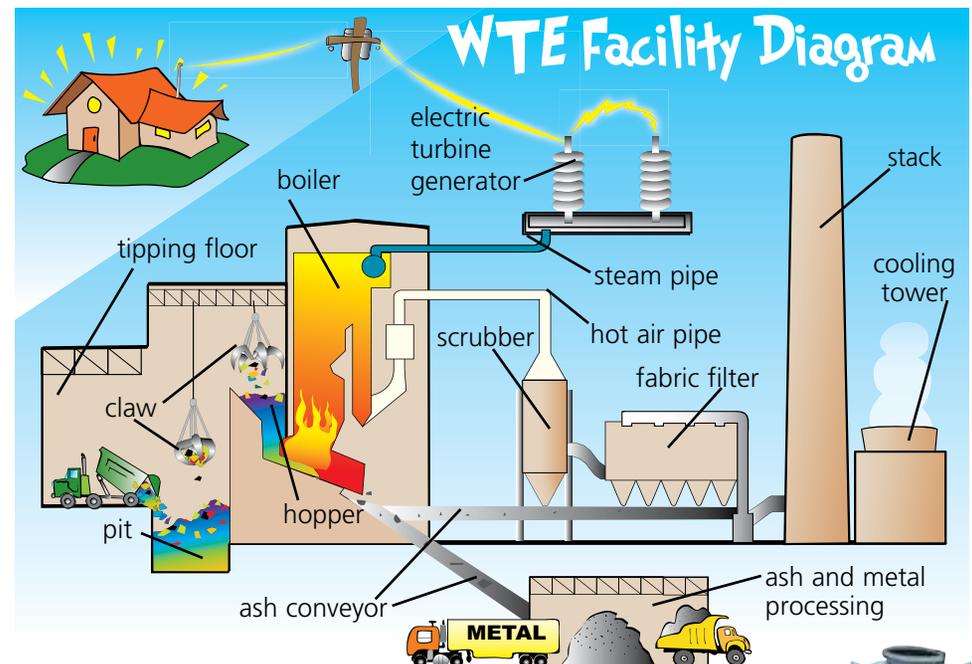


- The **scrubbers** remove pollutants such as sulfur dioxide. **Fabric filters** work like a giant vacuum cleaner to capture airborne dust (**fly ash**). The air released from the stack (**emissions**) must meet federal and state air pollution regulations.



Factoid!

The white "smoke" you see coming out of the cooling towers is actually water vapor.



5 Scalehouse



The yellow post (indicated by the arrow) at the entrance to each scale can detect radiation.

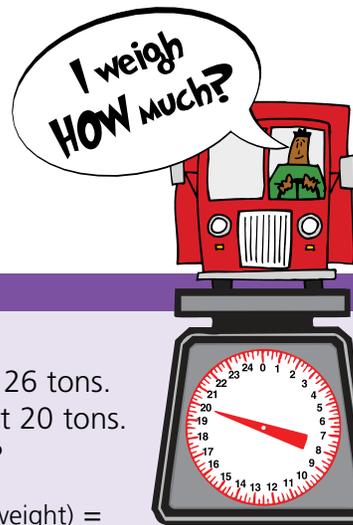
- The scalehouse weighs each truck coming in and going out to calculate the amount of waste they have delivered.
- Since 1988, Pinellas County has charged a tipping fee of \$37.50 per ton of waste.

Factoid!

An average of **1000 vehicles** are weighed at the scalehouse every day!



- Staff at the scalehouse work with inspectors to direct customers and **keep out prohibited materials**. Some prohibited waste items (such as electronics) are redirected to HEC₃, while others (such as hospital waste) may be directed to another facility.



You work in the scalehouse. A full garbage truck arrives weighing 26 tons. It dumps its garbage and weighs out at 20 tons.

How much do you charge?

26 tons (full weight) - 20 tons (empty weight) = 6 tons of garbage

6 tons x \$37.50 tipping fee = **\$225** **\$CHA-CHING\$**

6 Hand Unload & 7 Hot Pad



Residents delivering garbage to the landfill are directed to the hand unload area.

- The **hand unload area** is used to safely unload trash from smaller vehicles.
- The trash is sorted for recycling or disposal.
- **Bulky items** such as mattresses that can clog the **Waste to-Energy (WTE)** equipment are sent to the landfill.
- **Tires** are sent to the WTE Facility to capture the high **BTU**-value.

Factoid!

Steel is recovered from the WTE ash after the tires are burned (**4 pounds per tire on average**).



- The **inspection ("Hot Pad") area** is used to:

1. **Inspect vehicles** randomly or if a vehicle triggers the radiation alarm.

2. **Search for items** that were thrown away by mistake (such as passport). The fee is \$100.



3. **Extinguish fires** in garbage trucks. The truck driver dumps the load, a bulldozer spreads out the burning garbage, and workers use hoses to put out the fire (see below):



- What items might be thrown in the trash that could cause a fire?



8 Tipping Floor



This awesome claw delivers 3.5 to 5 tons per grab!

- The **tipping floor** is the area of the **Waste-to-Energy (WTE) Facility** where garbage trucks dump ("tip") their loads.
- There are **three huge crane claws**. The claws grab the garbage and drop it into a **hopper** that feeds the **boiler**, where the garbage is used as fuel (see diagram on page 9).

Factoid!

The Waste-to-Energy boiler burns at **1,800° Fahrenheit** (982° Celsius)!



- The **WTE Facility** burns garbage around the clock, except when it's down for maintenance. Since the scale-house is not open continuously, the tipping floor has a storage area (**pit**) that holds about **6,000 tons of garbage** in order to maintain a constant source of fuel for the boiler.

The tipping floor pit is 240 feet by 55 feet, and 35 feet deep. Multiply these together to find the total **volume**:

PIT VOLUME

240 ft. x 55 ft. x 35 ft. = **462,000 cubic feet***

and that's just **2 days worth of trash!**

*13,083 cubic meters

- What **recyclable** items do you see on the tipping floor?



9 Ash & Metal Processing



A conveyor belt carries ash from the boiler to the Ash & Metal Processing building.

- When garbage is burned at the **Waste-to-Energy Facility**, there is **ash left over** (similar to the ash in the bottom of a fireplace or stove). 
- **Ash** collected from the bottom of the boiler (**bottom ash**) is combined with the small airborne particles (**fly ash**) captured by the scrubbers and fabric filters.
- **Metals (ferrous and non-ferrous)** are removed from the ash using magnets and **eddy currents**. The metals are shipped to steel mills and other metal recyclers. 

- After the metals have been removed, the remaining ash is used as **daily cover** in the landfill or as a base material for landfill roads.



Factoid!

Waste-to-Energy **combustion**:

- 1) **reduces the VOLUME of garbage by 90%** so 10 cubic yards of garbage becomes 1 cubic yard of ash.
- 2) **reduces the WEIGHT of garbage by over 70%** so 10 tons of garbage is reduced to less than 3 tons of ash. 

- Why recycle steel cans if we can recover metals from the burned ash? 

10 South Landfill

Factoid!

Skilled operators use huge compactors (**weighing over 55 tons!**) to spread and compact the garbage.



When the Waste-to-Energy Facility is not available, as much as 5,000 tons of garbage may be buried in a single day!

- The **South Landfill** is used to dispose of garbage that cannot be burned or exceeds the capacity of the **Waste-to-Energy (WTE) Facility**.
- Garbage that is **putrescible** can rot and attract pests such as birds or rats (**vectors**).

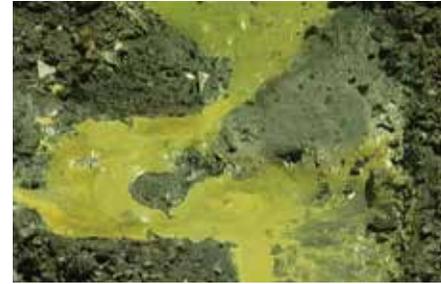


- Rather than being dumped randomly in the landfill, garbage is dumped in a small designated area (**working face**). Each day, the garbage is compacted and covered with a 6-inch thick layer of ash (**daily cover**).

- On average, **200 tons of garbage and over 600 tons of ash** are disposed here daily.
- The landfill was excavated 20 feet below ground level when it opened in 1979. Now it is 90 feet high and planned to go up to 150 feet. When the landfill exceeds 110 feet, our "garbage mountain" will become the **highest point in Pinellas County!**
- There is currently **more than 80 years of space** left in the landfill.

■ Where will your garbage go when Bridgeway Acres Landfill is full?

Landfill Liner



Leachate that results from rainwater trickling through the garbage is collected.

- A **sanitary landfill** must have a **liner** to collect water. Some landfills use a plastic liner, but Bridgeway Acres has a **natural clay layer** (20 to 50 feet thick) under the entire 730-acre site.



"Trash Tub"

Our clay "bathtub" protects the **groundwater**. The natural clay layer underground acts like the **bottom of a bathtub**. The man-made clay walls around the landfill form the **sides of the bathtub**.



11 Pond A



The narrow wall (*finger baffle*) indicated by the arrow helps sediment in the pond to settle.

- Gravity-flow canals and ditches carry all the water on site, including *leachate*, to **Pond A**.
- Pond water is pumped (over 1,500 gallons per minute) to the *Waste-to-Energy (WTE) Facility* to be reused in the cooling towers.

Pond A is 65 acres by 14 feet deep. There are 43,560 square feet in an acre. Multiply these together to find the total *volume*.

POND VOLUME

65 acres x 14 ft. x 43,560 sq. ft./acre

= **39,639,600 cubic feet of water***

*320,705 cubic meters

What water would be used for the Waste-to-Energy cooling towers if the pond was not there?

- All the water that you see on this tour, including Pond A, is considered *leachate* (“garbage juice”) even though very little actually comes in contact with garbage. Most stormwater runs down the slopes of the landfill rather than *percolating* through the garbage buried underneath.
- The pond water is required to meet federal and state standards for surface water quality. A **variety of wildlife** live in the pond—including birds, fish and alligators.

Factoid!

We regularly test the water from 40 wells surrounding the landfill to ensure that the *groundwater* is safe.



12 West Landfill



Construction and demolition waste can be extremely heavy!

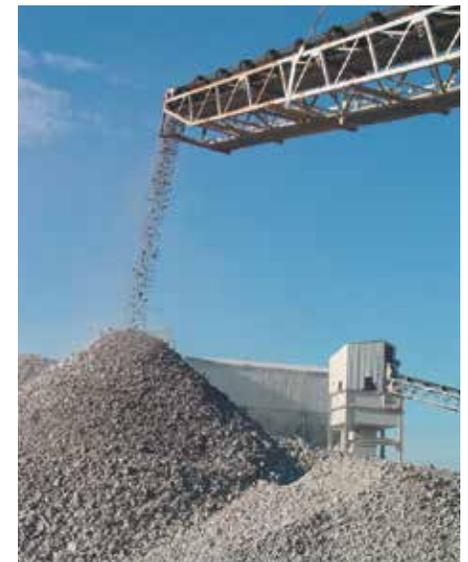
- The **West Landfill** is used only for non-*putrescible* waste that does not rot or decay, such as *construction and demolition (C&D) waste*.
- C&D waste is generated when buildings, roads and bridges are built or torn down.

Factoid!

There is a 36-foot bridge in North Carolina made, not of concrete, but **one million recycled milk jugs!** Located next to Fort Bragg, the bridge is strong enough to drive tanks across.



- Examples of C&D waste are **cement, roofing, dirt, bricks, asphalt, wood, drywall and mattresses**. These bulky items are generally kept out of the *Waste-to-Energy (WTE) Facility* since they don’t burn well or could clog the machinery.
- Most of the C&D waste generated in Pinellas County is processed at private facilities, and **much of this is recycled**. For example, chunks of concrete from a demolished building can be crushed into gravel (see below) and used to build roads.



13 Yard Waste-to-Mulch



The yard waste piles are turned three times to speed up decomposition.

■ **Yard waste** is exactly that—**waste from your yard**. It includes tree branches, grass clippings, palm fronds, stumps and leaves.

■ Yard waste is recycled into **mulch** which is available for free at 20 convenient sites around the county.

Factoid!

Create **compost** at home by putting **yard waste and kitchen scraps** in a separate bin. Visit: <http://compostinfo.com>



■ Yard waste is ground up, and then sterilized using a natural heating process. As micro-organisms begin to break down the material, the temperature begins to rise. A minimum temperature of 132° F (55° C) is maintained for 45 days. The high temperature and the heat-loving bacteria (**thermophilic microbes**) that flourish in it effectively destroy weed seeds, plant diseases (**pathogens**), and pest insects.

■ What would your reply be if someone said recycled mulch is full of bugs and grass seeds?



Huge grinders pulverize yard waste into chips.

Reef Program



Divers, photographers and fishermen enjoy our underwater reefs. Fish do too!

■ Pinellas County's Reef Program uses clean **construction and demolition waste (C&D)** to create marine **habitats** in the Gulf of Mexico.

Factoid!

Some of the more unusual items we've used to create reefs are a **shrimp boat**, **World War II bomber airplane** and **10 Army tanks!**



■ **Reefs** are created by placing waste materials such as **concrete pipes, steel beams or entire ships** on the ocean bottom.

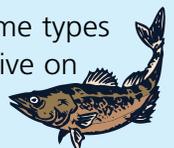
■ Aquatic creatures such as algae, barnacles and coral attach to the hard surfaces. Fish come to feed on these creatures.

■ The materials used for our reefs are **safe and non-polluting**.



Our reefs create an underwater **habitat** for fish to feed and live.

■ What are some types of fish that live on our reefs?



14 Industrial Water Treatment Facility



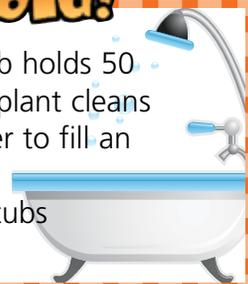
Water is taken from Pond A on the Solid Waste grounds and brought to the treatment facility. It then goes into a settling tank to separate heavy particles from clear water. After that, the clear water is treated with chemicals to kill harmful bacteria, and fine filters and membranes remove small particles and salts.



- The plant burns garbage to heat water in large boilers. Water is needed for both the boilers and the cooling towers. The plant operates seven days a week – which means it needs a lot of water!
- On average, the plant cleans 2 million gallons of water per day—but it can treat up to 3 million gallons in a day!

Factoid!

A big bathtub holds 50 gallons. The plant cleans enough water to fill an average of 40,000 bathtubs every day!



What did I learn on the tour today?

1 I can help the environment by practicing the “3Rs”. Fill in the “Rs”, and list one activity you can do for each:

 R _____

 R _____

 R _____

2 Pinellas County residents and visitors generate approximately _____ tons of municipal solid waste per year.

3 In our solid waste hierarchy, the preferred (#1) option for managing solid waste is _____. The last (#5) option used is _____.

4 Pinellas County’s recycling rate is about ____%. The percentage of trash that could be recycled is ____%.

5 The #1 item in our trash that could be recycled is _____ at 26%.

What did I learn on the tour today?

- 6** Name 2 examples of hazardous waste that should not be thrown in the trash:

- 7** Our _____ Facility generates electricity by burning garbage.
- 8** Why is the inspection area nicknamed the "Hot Pad"?

- 9** Name 3 things you saw on the tipping floor, and circle which ones could have been recycled:

- 10** A sanitary landfill has a liner to prevent _____ or "garbage juice" from contaminating the groundwater.



Glossary

- "3Rs"** - Reduce, Reuse and Recycle (our waste reduction strategy). (p. 3)
- boiler** - area of the Waste-to-Energy Facility where water is heated and turned into steam by burning garbage. (p. 12)
- bottom ash** - slag or other residue remaining in the WTE boiler after the waste is burned. (p. 13)
- BTU** - (British Thermal Unit) a unit of energy equal to the amount of heat required to raise one pound of water by one degree Fahrenheit. (p. 11)
- "closing the loop"** - buying a product made with recycled materials completes the 3-part recycling cycle: collect, process and buy. (p. 6)
- combustion** - WTE burning process. (p. 18)
- compost** - a mixture consisting largely of decayed organic matter that is used for fertilizing and conditioning the soil. (p. 18)
- construction & demolition (C&D)** - waste materials such as concrete that result from building or destroying structures. (p. 17)
- curbside recycling bin** - special container for recyclables that is placed at the curb for pickup. (p. 7)
- daily cover** - layer of ash or dirt used to cover newly-landfilled garbage at the end of each working day to reduce smell, disease and blowing trash. (p. 13)
- debris** - unwanted remains; waste. (p. 4)
- decomposition** - decay or rot. (p. 18)
- drop-off recycling center** - designated area where residents go to drop off recyclable materials (such as cans) in labeled containers. (p. 7)
- eddy current** - electrical current creating a magnetic field that separates metals such as aluminum from the ash. (p. 13)
- emissions** - outgoing air released from the WTE Facility stack. (p. 9)
- fabric filter** - WTE equipment, referred to as a "bag house," which uses fabric bags to filter out airborne particles such as fly ash. (p. 9)
- ferrous** - a metal containing iron. (p. 13)
- finger baffle** - narrow wall that redirects water flow to allow more time for sediment to settle. (p. 16)

Glossary

fly ash - small airborne particles of ash from the WTE burning process that are removed by scrubbers and filters. (p. 9)

groundwater - the water that is naturally stored underground. (p. 15)

habitat - the natural environment of a species. (p. 19)

hazardous waste - any substance that is destructive to the environment or harmful to the health of humans or animals. (p. 9)

HEC₃ - the Household Electronics and Chemical Collection Center used by residents to drop off hazardous waste items. (p. 8)

hierarchy - ranking or classification system. (p. 4)

hopper - the chute that feeds waste into the boiler for burning. (p. 12)

hot pad - an area where vehicles are inspected, searched for items that were mistakenly thrown away, or burning debris can be extinguished. (p. 11)

landfill - an area of land that is filled with garbage. See sanitary landfill definition on page 24.

leachate - "garbage juice" or water that has passed through or comes in contact with solid waste. (p. 16)

liner - plastic or clay barrier placed between garbage and soil to prevent leachate from leaking into groundwater below (similar to a trash bag preventing garbage leaking into your trash can). (p. 15)

mobile collection - portable hazardous materials collection events held on Saturdays in convenient locations around the county. (p. 8)

mulch - a protective covering (such as wood chips or leaves) placed around plants to prevent weeds, water loss and erosion. (p. 18)

municipal solid waste - garbage or trash generated by residential and commercial (non-industrial) sources. (p. 4)

non-ferrous - a metal that does not contain iron (such as copper, aluminum, brass or zinc). (p. 13)

pathogen - disease-causing organisms such as bacteria or fungus. (p. 18)

percolate - to cause a liquid to pass slowly through a porous substance. (p. 16)

pit - the waste holding area of the WTE Facility (holds two days worth of incoming garbage). (p. 12)

Glossary

putrescible - able to rot or decompose quickly (such as food). (p. 14)

radiation - ionizing energy that can damage cells. (p. 10)

recyclable - materials which can be recycled, such as cardboard. (p. 6)

recycle - to re-manufacture materials for a new use. (p. 4)

reduce - to use less of an item. (p. 4)

reef - underwater structure that attracts marine life. (p. 19)

reuse - to use an item again. (p. 4)

sanitary landfill - a self-contained facility for garbage disposal with a liner that prevents groundwater contamination. (p. 15)

scrubbers - WTE Facility equipment using lime to remove pollutants such as hydrogen chloride and sulfur dioxide from the outgoing air. (p. 9)

solid waste - trash, garbage or unwanted items. (p. 3)

Swap Shop - an area of the Household Electronics and Chemical Collection Center (HEC₃) where residents can take or leave household chemicals and paints for free. (p. 8)

thermophilic microbes - microscopic (too small to see), single-celled bacteria that thrive in high temperatures. (p. 18)

tipping fee - the charge for disposing of waste (\$37.50 per ton). (p. 10)

ton - a measurement of weight equal to 2,000 pounds. (p. 10)

turbine - rotary engine that extracts energy from steam. (p. 9)

vector - an organism that transmits disease, such as a rat or bird. (p. 14)

volume - the amount of 3-dimensional space an object occupies. (p. 12)

waste - anything discarded, useless or unwanted. (p. 10)

Waste-to-Energy (WTE) Facility - power plant that uses garbage for fuel to generate electricity. (p. 9)

weight - measure of the heaviness of an object. (p. 13)

working face - landfill area where waste is currently being buried. (p. 14)

yard waste - unwanted vegetative matter such as tree branches, grass clippings, palm fronds, stumps and leaves. (p. 18)



Now you know where your garbage goes when you throw it "away!"

THINK BEFORE YOU THROW!
Make less waste by using the 3Rs—
reduce, reuse and recycle.



For more information on recycling, visit:
www.pinellascounty.org/recycle

TOUR CERTIFICATE

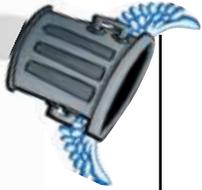
This certifies that

successfully completed the
"No Such Place As AWAY!"
educational tour of the Bridgeway Acres
Pinellas County Solid Waste facility.

DATE _____



Pinellas County Solid Waste
3095 114th Avenue North, St. Petersburg, Florida





*Thank you for touring
Bridgeway Acres!*



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Printed on recycled paper

09/14