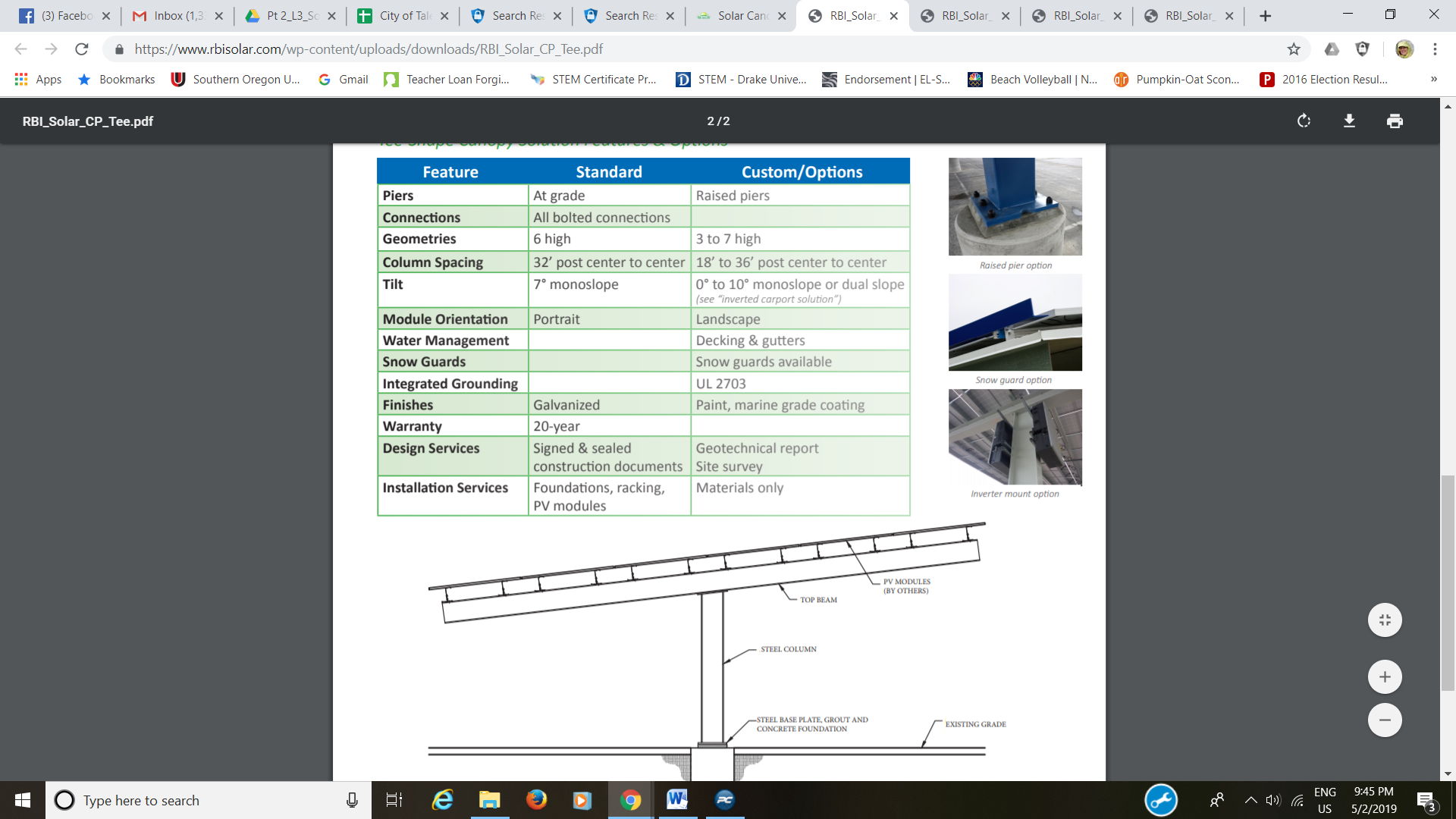
Use the information below to answer the following questions.

**SHOW YOUR WORK! You may use a calculator, but to get credit, you must record your thinking.**

Students from TMS have suggested that staff parking adjacent to the track at Talent Elementary school be used to harvest solar energy. The solar panel chosen for the project is drawn below, along with the selected carport. The carport will cover the center parking spaces and face the sun at 309 degrees. Use this information and the details below to answer the questions.





Carport is 18 feet by the width of a parking area. (Each parking space is 18’ x 8’). Maximum tilt is 10 degrees. The carport will cover 19 parking spaces (one block of 10 and one block of 9).

1. What are the dimensions of the solar panel ?

\_\_\_\_\_\_\_\_\_\_\_\_long x \_\_\_\_\_\_\_\_\_\_\_\_\_wide (in decimal form)

In feet and inches? \_\_\_\_\_\_\_\_\_\_\_\_long x \_\_\_\_\_\_\_\_\_\_\_\_\_wide (Round to the nearest 1/2”)

2) What are the dimensions of the carports? 10 car: \_\_\_\_\_\_\_\_\_\_\_\_long x \_\_\_\_\_\_\_\_\_\_\_\_\_wide

9 car: \_\_\_\_\_\_\_\_\_\_\_\_long x \_\_\_\_\_\_\_\_\_\_\_\_\_wide



3) If you were to layout the solar panels lengthwise across the full length of the 10 parking spaces, how many solar panels would fit on the 10-car carport? Show your work.



4) If you were to rotate the solar panel 90 degrees, and layout the solar panels across the full length of the 10-car carport, how many solar panels would fit on the carport? Show your work.



5) If you were to layout the solar panels lengthwise across the full length of the 9 parking spaces, how many solar panels would fit on the 9-car carport? Show your work.



6) If you were to rotate the solar panel 90 degrees, and layout the solar panels across the full length of the 9-car carport, how many solar panels would fit on the carport? Show your work.

7) Label the diagram below with the overall dimensions of the carports and solar panels. Use the most efficient layout for each. 



8) How much area of the roof does the solar array cover for the 9 car? And for the 10 car?

9) What is the area of the 9-car carport roof? And for the 10-car carport roof?

10) What is the percent coverage for the 9-car carport? And for the 10-car carport roof?

Use PV Watts (and the information provided above) to find the answer the following questions:

Address: 307 Wagner Creek Rd, Talent, OR

11) What is the tilt of the solar panels (assume the maximum slope of the carport)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12) What is the azimuth? \_\_\_\_\_\_\_\_\_\_\_\_

13) Complete the following table.

|  |  |  |
| --- | --- | --- |
|  | **9-car** | **10-car** |
| **DC System size** |  |  |
| **kWh output** |  |  |
| **Annual Value** |  |  |
| **Percent Solar Coverage** |  |  |
| **Adjusted DC System Size** |  |  |
| **Adjusted kWh output** |  |  |
| **Adjusted annual value** |  |  |

Project Costs:

14) The carport installation cost is $1325 per parking space. The cost of the 9-car carport is $5,798. The cost of the 10-car carport is $6,050. What is the total cost of installing the carports?

15) The cost of installing the solar panels is $2.25 per watt. What is the cost of installing the solar panels?

16) Assuming the project is eligible for the $25,000 commercial rebate, what is the return on investment for this project?

BONUS:

17) The annual cost of electricity is $47,700. If the rest of the parking in that same lot were covered, how much money would the school save annually? (For the remaining parking spaces, use an average of the 9- and 10-carport solar coverages.) What percent of the electricity would the savings equate?