

# Roper Energy Apartments Parking-Lots Plans

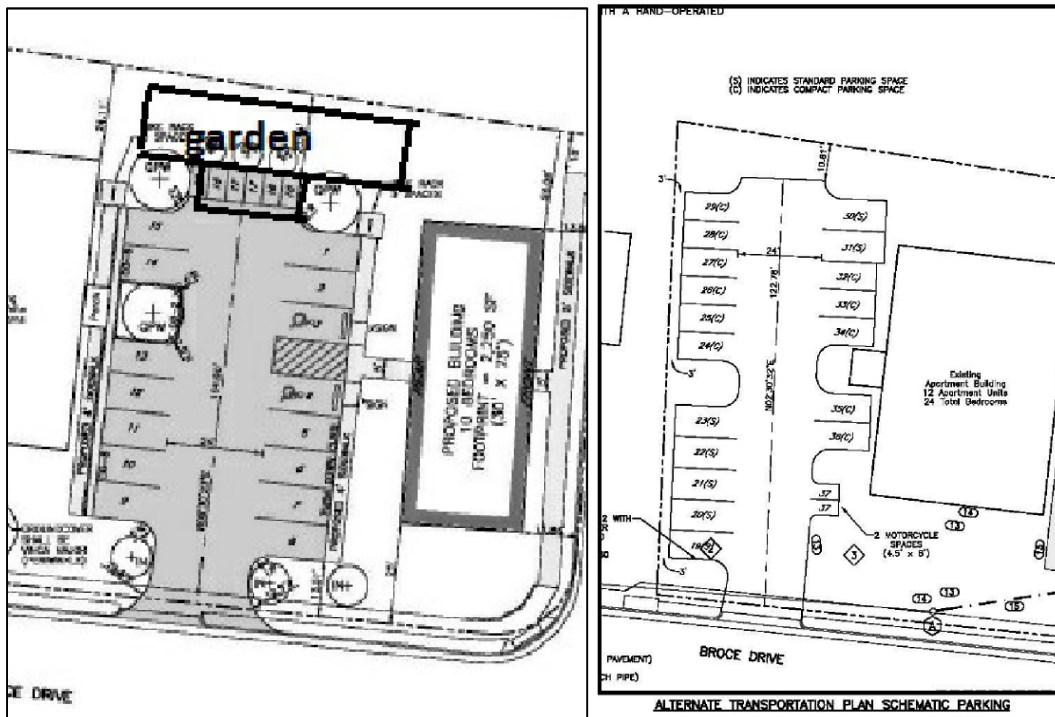
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There are two parking lots planned:

1. The main parking lot between the old building (Rowland Court Apartments, RCA, <http://www.roperld.com/science/SolarHotWaterApartmentHouse.htm>) and the new building (Roper Energy Apartments, REA, <http://www.roperld.com/science/roperenergyapartments.htm>). At the north end of this lot will be the recycling, composting and trash enclosure (17.5'x10') with a community garden (70'x15') behind and above the enclosure and a retaining wall as the back wall of the enclosure extending east and west from it.
2. The alternate parking lot west of RCA. A Versa-Green (<http://www.versa-lok.com/products/plantable-wall-systems/versa-green>) retaining wall will be at the north end.



The plan:

- Use dense asphalt or dense concrete slightly sloped toward the parking spaces for the drive lanes of both parking lots.

- Use pervious concrete for the parking spaces. (Pervious concrete has been successfully used in the area; e.g., at Community Housing Partners headquarters and at NRCERT in Christiansburg. It was installed by [Procon Foundations.](#))
- Use a sub-base under the pervious concrete consisting of 12" of course aggregate. This is enough to hold a 4" or larger rain for the area in which it exists.
- Place a 4" perforated pipe at the bottom of the aggregate below the pervious concrete along the edges between the dense asphalt/concrete and the pervious concrete to drain into the stormwater management system (SMS) on the south of RCA. A solid pipe will go under both driveways to connect perforated pipes in the parking spaces on the opposite sides of the parking lots to the SMS.

Having dense asphalt/concrete for the drives enables the pervious concrete to be installed first without unduly compacting the soil under it. The dense asphalt/concrete will be installed after the pervious concrete is installed. No curbing is needed; wheelstops made from recycled rubber or plastic will be used in the parking spaces.



*Paving with Pervious Concrete* by George Garber, P.25.

The inclusion of pervious concrete should allow the SMS to be smaller than needed for completely pervious parking lots. Taking into account the footprint of the building and making conservative assumptions that the pervious concrete will allow 75% of rainwater that hits it to drain into the soil and that the rainwater collection system for the building will save 50% of the building runoff, the SMS can be reduced by at least 33%. If both parking lots were totally pervious concrete, with the assumptions given above, the SMS could be reduced by at least 70%; perhaps not needed.

Perhaps 12" course aggregate could be placed under the dense asphalt/concrete, also. This might increase the water-storage volume enough to reduce the SMS by more than 50%.

The alternate parking lot will be built first as soon as the site plan is approved by the Town of Blacksburg. Then the decision will be made as to whether the main parking lot will be built the same

way. This allows the residents of RCA to have adequate parking during all stages of the construction of REA.

CU-Structural Soil ([http://www.hort.cornell.edu/uhi/outreach/pdfs/cu\\_porous\\_asphalt.pdf](http://www.hort.cornell.edu/uhi/outreach/pdfs/cu_porous_asphalt.pdf)) may be used as sub-base in the vicinity of trees to give the roots room to spread:

Size of Rain Event	Depth of Reservoir Needed to Mitigate Rain Event
1.56"	6"
3.12"	12"
4.68"	18"
6.25"	24"
7.8"	30"
9.36"	36"

Fig. 1.30 Reservoir depths and the corresponding levels of mitigated rain events based on the 26% void space within CU-Structural Soil® mix. Numbers in gray box illustrate the depths necessary to accommodate optimum healthy tree root development.

The reservoir depth under the pervious concrete would be the same for 26% void space; the reservoir depth for a different void space can be calculated from this table.

A Versa-Green (<http://www.versa-lok.com/products/plantable-wall-systems/versa-green>) retaining wall will be at the north end of the alternate parking lot, similar to the one at NRCERT:



Probably it will be built before the alternate parking surface is installed.

A standard retaining wall will be behind the recycling/composting/trash enclosure (17.5'x10') at the north end of the main parking lot and a Versa-Green retaining wall will extend west and east of it.