

Apr 25th, 10:15 AM - 10:30 AM

C. R. Anderson Parking Lot Expansion

Colter Brustkern
Carroll College, cbrustkern@carroll.edu

David Nielsen
Carroll College, danielsen@carroll.edu

Steve Clinch
Carroll College, sclinch@carroll.edu

Follow this and additional works at: <https://scholars.carroll.edu/surf>

Part of the [Civil Engineering Commons](#), and the [Transportation Engineering Commons](#)

Brustkern, Colter; Nielsen, David; and Clinch, Steve, "C. R. Anderson Parking Lot Expansion" (2019). *Carroll College Student Undergraduate Research Festival*. 92.

<https://scholars.carroll.edu/surf/2019/all/92>

This Event is brought to you for free and open access by Carroll Scholars. It has been accepted for inclusion in Carroll College Student Undergraduate Research Festival by an authorized administrator of Carroll Scholars. For more information, please contact tkratz@carroll.edu.

CR Anderson Parking Lot

By: Steve Clinch, David Nielsen
and Colter Brustkern

Project Overview

C.R Anderson Middle School,
Helena, MT.

- Design a 9,000 ft² parking lot expansion
- Asphalt (HMA) lot with 45° angled parking spaces in a N/S orientations
- Stormwater retention pond



Alternatives

- ❖ Parking Lot Materials
 - **Hot Mix Asphalt (HMA)**
 - Gravel
 - Concrete
- ❖ Water Treatment Options
 - Drain to Field
 - **Retention Pond**
 - Oil water Separator



Design Criteria and Constraints

- ❖ ADA Regulations
- ❖ Engineering and Design Standards of the City of Helena
 - Stormwater
 - Parking lot
 - Landscaping
- ❖ School Accomodations



Environmental/Societal Impacts

❖ Environmental

- Stormwater Runoff
- Pollution from parked cars

❖ Societal

- Construction Noise
- Potential detours
- Freed street parking



Technical Analysis

❖ Goals

- Establish positive and negative aspects of alternatives.
- Ensure design criteria would be met.
- Eliminate alternatives that do not meet design requirements.

❖ Outcomes

- Gravel Lot eliminated.
- Drainage to field Eliminated.
- Oil/Water Separator Eliminated.



Cost Analysis

- ❖ Looked at cost of:
 - Mob/Demob of equipment
 - Excavation work (Lot and pond)
 - Subbase and base material
 - Amenities
- ❖ Comes down to price of concrete vs. asphalt
 - Price of project Asphalt: \$44000
 - Price of project Concrete \$52000



Recommended Alternative

❖ Asphalt

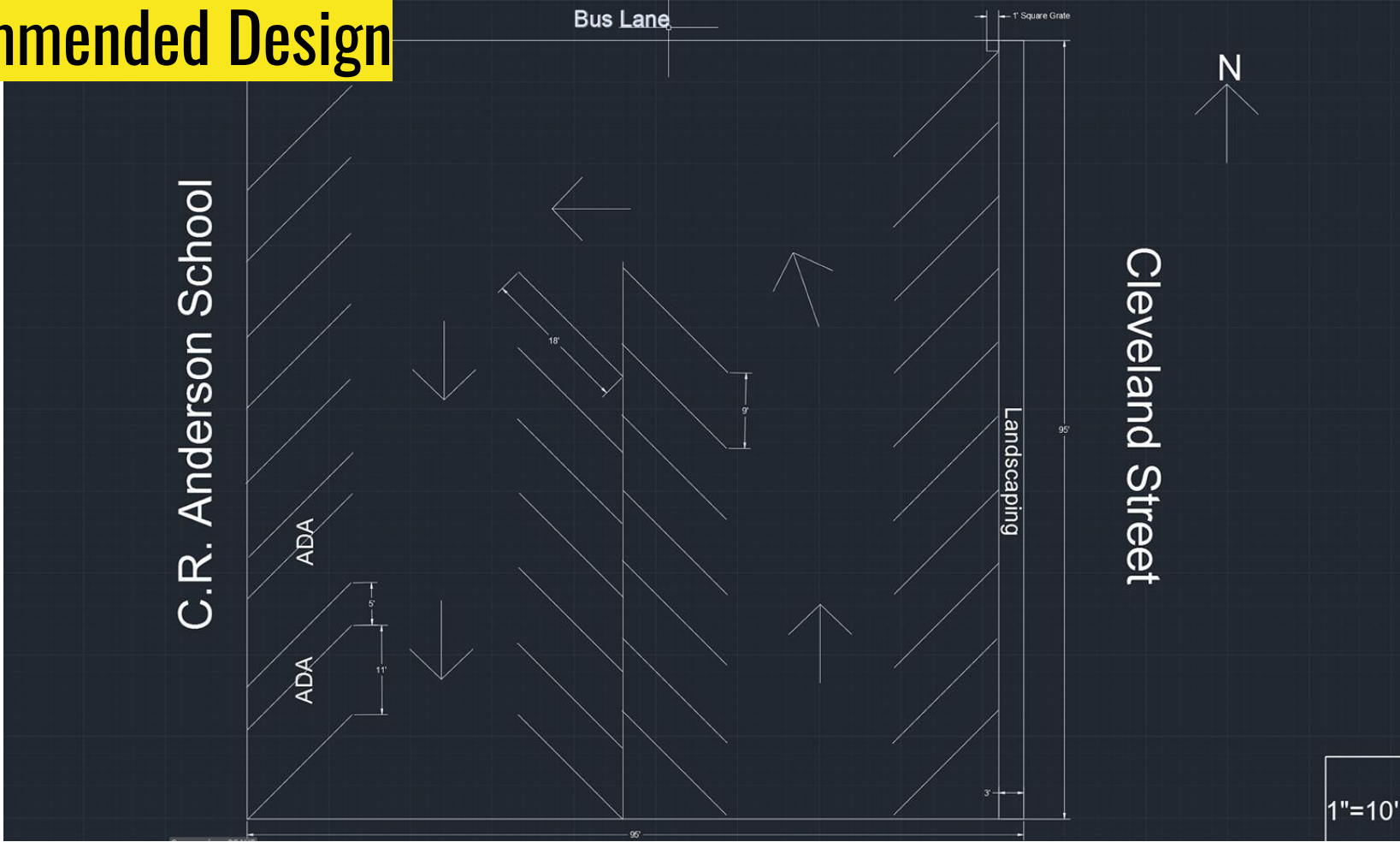
- Meets design criteria/constraints
- Cheaper than concrete
- Long lasting
- Low maintenance

❖ Retention Pond

- Low maintenance
- Low cost
- Traps pollutants
- Can handle runoff effectively



Recommended Design



Picture References

https://www.concreteconstruction.net/business/management/is-it-time-for-a-new-accessibility-logo_o

<https://www.quickanddirtytips.com/productivity/meetings/idea-parking-lot-for-efficient-meetings>

<https://www.google.com/url?sa=i&source=images&cd=&cad=rja&uact=8&ved=2ahUKEwjjoqKs-ozhAhWL-VQKHThsAJ8QjRx6BAgBEAU&url=https%3A%2F%2Fcooperator.com%2Farticle%2Fdont-let-construction-noise-drive-you-crazy%2Ffull&psig=AOvVaw2jdE8bJAdhKHoqUUJooCCb&ust=1555790980376474>

https://helenair.com/c-r-anderson-middle-school/article_63c3d88a-03ef-11e5-a32d-03f009f8e18d.html

<http://www.wschronicle.com/2018/04/commentary-keys-money-mastery-2/>

https://www.google.com/url?sa=i&source=images&cd=&cad=rja&uact=8&ved=2ahUKEwiOmrX8_NzhAhUEBHwKHXm2DDQOjRx6BAgBEAU&url=http%3A%2F%2Ffourtownlive.com%2Ffourtown%2F%3Fp%3D5653&psig=AOvVawo-PiCfGKUV5IzbVURjWFFa&ust=1555791452721265