

Charles Beauchamp

Dr. Brian Wasserman

Internship Reflection

My internship was at Northwest Asphalt in Shakopee. Northwest is for a majority of our work a subcontractor, but we still have a large amount of work where we are the general contractor, that consists of three divisions: Paving, utilities, and excavation. I was a part of both the utilities and paving division over the course of my internship. Overall, my internship was a great experience considering I am continuing my career with them.

Northwest has been around for three generations in Minnesota. It was founded in 1928 by Don Pfeiffer, and originally had the name "Pfeiffer Construction". Pfeiffer Construction was the first company to bring a Blacktop Plant to the state of Minnesota. The company eventually changed its name to northwest in the 70's, around the same time started their excavation division. The company kept growing over time and bringing in more people every year. In 2000 Northwest hired a Maverick alum who graduate in one of the first classes of Construction Management in the 70's to start our utility division. Now our utility division is by far our division that makes the most money at the company, and Northwest now one of the lead utility companies in Minnesota due to it.

Northwest varies in the work it does vastly. We do Commercial, residential, and municipal paving, excavation, and paving. Having this open scope, it allows Northwest to succeed in all areas of civil construction. The most profitable jobs we have are municipal street reconstructions, where we can use all three of our division to our advantage. We can do removals and all dirt work with our excavations department, remove and replace all

underground utilities with our utility division, and then top it off with new blacktop from our paving division. On these jobs usually the only subcontractors we really need is striping and concrete work, which means we have a lot more money coming our way.

The second most profitable jobs we have is residential sitework, which is a very large majority of our jobs as of the last five or ten years. These projects allow us to run all three of our divisions on one job once again, and usually the five or ten developments we get a year is enough to keep us busy for the season. Northwest does the sitework for almost every D.R. Horton development in the suburbs each year. On top of that, Northwest is also responsible for almost every neighborhood being constructed in the Lakeville and Cottage Grove area.

Our street reconstructions and residential site developments are only about half of our work each season. We usually have specific crews in each division that only work in commercial. Even though the commercial jobs are a little more work for less money, Northwest has so many commercial jobs, that it makes about the same amount of money each year as our bigger projects.

This year, Northwest is heading towards its biggest year in history, as it already has over 100 million dollars in work before April even begins. At this point we must be very selective of our bidding because we simply do not have the manpower available to complete any more work. There are talks of bringing in 2 more estimators in the next year, and we are trying to get an additional crew for each division if possible so we can bid more work. This is not only good because Northwest is becoming a serious powerhouse in the Civil industry in Minnesota, but they also want to bring in more interns from MSU. I was the first intern at Northwest, and they already hired another one for this upcoming season. Now we are thinking we are more than

likely bringing in two or three MSU interns in for the 2023 season. Almost our whole project management staff is Mankato Graduates, so we almost are exclusive to Mankato interns. Everyone here loved having an intern because they get to have an assistant for all the extra work possible, and on top of that they know they are giving back to their former program and teaching someone new information. As far as I know, you can expect several Mankato Students doing their internship at Northwest every year from here on out.

Sewer systems have been around civilizations for thousands of years. The first sign of sanitary sewer was found in 3000 B.C. in Pakistan. We then saw our first civil engineers in Rome when they built entire city sewer systems and watermains. Today, almost every building we have ever been inside of or road we have driven on is connected to some sort of sewer and water system. The Romans was the first civilization to build the first “true” watermain. They invented the water wheel and aqueducts to transport the water from its source to the city. The aqueducts were essentially just a big waterslide. It was exposed on top the entire route and used gravity to force it to the city. The Romans built large bridges for these aqueducts to cross over any uneven ground. These aqueducts lead from the water wheel in a nearby river that would spin from the current and scoop the water into the aqueduct.

The first watermain we saw in the United States was in Chicago in 1842. The pipe ran 150 feet into Lake Michigan and was the beginning of revolutionary technology here. Drainage wise, the first sewers in America were both sanitary and storm sewers combined. The waste would eventually lead into lakes and rivers, which was also the same place as people were getting their drinking water. Eventually people realized what was causing so much illness, so they decided to separate the storm and sanitary sewer so they could properly treat all waste

and keep it away from the fresh water. By 1892 only 27 cities in the country had separated sanitary and storm sewers due to the fact that it was much more expensive to build two runs of pipe than one. The Federal Water Pollution Control Act of 1948 was eventually put in place. This act made sure that all water must be held to a certain quality standard, which means that the two sewers must be separated. Today we see pretty much every sewer system in America is separated between sanitary and storm.

The first sign of paving with asphalt was discovered to be in about 1500 A.D. by the Incas. They had very similar bituminous pavements that we see today. After that asphalt was again discovered in Switzerland in large seyssel plants. This led to the first asphalt road being paved in France in 1852. The people loved the asphalt road compared to rough dirt or stone roads, so it eventually made its way to the United States. The first Asphalt road in the United States was paved in 1870 in Washington D.C. This trend eventually made its way to New York, and impressively enough, even in its early development stages asphalt still held up for 15 years. During the great depression, the asphalt industry really boomed. Over the decade, the number of asphalt paved roads in the United States went from 50,00 to 210,000. The amount of asphalt mix went from 500,000 tons to 1,800,000 tons annually. The industry also boomed during World War II due to the number of runways that required to be paved. The original idea was for planes to take off and land on grass runways in fields, but as the planes got bigger and heavier, they needed to have their runways paved to support things like the B-29 Bomber, which weighs 140,000 pounds.

When I worked at Northwest, I was a part of the utility and paving division. More so the utility division than anything. Coming into the internship, I had never worked on a pipe crew, or really had been familiar with it. I originally had planned on being in the excavation division, but once I started doing the utilities, I found that it was much more interesting than both paving and excavation. Paving and excavation bids have so much less going on than pipe. Paving is very repetitive and two dimensional, and bidding excavation is all in the equipment you use and where you can get your material. Utilities work in much more of a 3-dimensional space than either and there is much more going on. Almost every pipe job we have is for storm sewer, sanitary sewer, and watermain. So right off the bat you have essentially three jobs going in one bid. You also have to bid all of the excavation separately. With pipe you almost have to look at it in a different way because it feels like the entire job is yours, even when you are just a sub. Paving and excavation almost always you are just a subcontractor, and that one thing is all you have to worry about. I still would like to get more into excavation sooner than later because I am more familiar with it, and once I do that, I should be able to bid the entire sitework for each job, which would make getting jobs much easier. I learned during my internship how much bidding jobs as packages improves your chances of getting the job in commercial work. It is much easier for. The general contractor to bill to one person rather than two.

Since I had never worked in utilities, I learned so many new things. I did not even know simple terminology for all the things for utilities, or what kind of pipe goes for each sanitary sewers, storm sewers, and watermain. Now I can bid pipe on my own and speak the language. In fact, I liked the utilities so much over my internship, I wanted to go in the field this summer and work, so I had experience for future bidding. But things changed when a paving project

manager announced he was going to retire at the end the end of 2022, and I was asked if I would shadow him for the year and takeover his position once he retires. I enjoy paving, but I both me and the company know I do not plan on staying 100% in paving my entire career. The unfortunate part is that it doesn't allow me to go out in the field for the summer and get field experience, and I most likely will not ever get the opportunity to. It's both a good and bad thing, but I am happy wherever the road takes me.

I also learned a bunch in the asphalt division since I had never done that. I learned what mixes are used and where, what the different oil are good for. Some oils are thinner and more flexible than others. Same with the aggregate, sometimes it is better the use larger rock in your mix, and others you want to see a smaller finer rock to get a smoother surface. I also learned how important trucking was when it comes to paving is. Fifty cents cheaper per ton on trucking can make or break your bid. I got a job that is 26,000 tons of recycled class 5 for the base, and getting the trucking about fifty cents cheaper, saved over 10,000 dollars.

Estimating asphalt was both easier and harder than bidding pipe. The actual math itself is much more difficult in pipe, but by the time I started estimating utilities I knew everything that had to be done for each job from tracking the daily quantities. With Asphalt on the other hand, I went into it completely blind. I picked up a few things here and there just from the other project managers, but I had no idea how anything actually worked outside of the paving itself. Now after a few months of estimating it, I know

The main job I had during my internship was tracking the quantities for our 8 utilities crews, and 4 clean-up crews. Tracking the utilities was a big part of how I got so familiar with how the utility process is done. Right before I started, Northwest bought a new project

management software called Bid 2 Win. It works similar to CHS I hear from others who have used it. It is an app that allows you to load crew, labor, and equipment rates into it, then have to do far less work when bidding your jobs. It also allows you to upload that bid to the tracking side of the app, and automatically track your quantities of material, labor, and equipment on the job. So the foreman would fill out this sheet on this app and fill out all of their information for each day. Those quantity sheets would land on my desk each week and I would track all of the quantities separately for our accounting department. The task of tracking these would consist of going in the plans and tracking all of the pipe runs, structures, fittings, erosion control, and dirt for the jobs. Because these were so detailed, it allowed me to know exactly what was going on with the job in every aspect. Often I would know more about what went on that week than some of the project managers who were running them.

Tracking the jobs really helped me once it came time for me to start estimating pipe. Because I saw exactly how much pipe each crew can lay in the day. And all our utility estimators bid the job for the crew they think is most likely going to be working with. They do this because some crews might be able to put 1,000 feet of watermain in each day, but only be able to do 350 feet of sanitary sewer a day because they aren't as fast at setting structures. Other crews are totally flipped and might only be able to do 600 feet of watermain a day, but also can do 600 feet of sanitary sewer a day. Some of our crews are really good at working in sand, and others are really fast at going 40 feet deep and subcutting the whole pipe run. Once I got to know the crews I was able to setup my progression on my bid for how fast they could lay pipe. My senior project manager who I was working with would help me out with knowing which

crew to bid it for, and how much money to put on specialty structures like lift stations and inside drops.

Tracking the daily quantities also helped me with getting familiar with the accounting side of things at Northwest. This position is technically considered part of our finance team, but it is just where they usually put all the new project managers to get them familiarized with how the company runs, and how to talk to about each kind of billing item. On top of that it also helped me get comfortable and get to know everyone in the office. On our Daily quantity sheets there is a place for the foremen to put if there was any Time & material extra work that day. Whenever I saw this, I would have to go have a conversation with the project manager on that job about whether they want to charge extra for that work, or if it was incidental. I would also have to talk with people in the finance department almost every day about if something is being billed as time and material, give them receipts for things like asphalt mix, and communicate with them whenever a substantial amount of work is completed and we are ready to start billing for it.

One thing I learned during my internship that I did not know before is how much GPS surveying is self-performed by the company. I assumed that there was surveying subbed out at the beginning and end of the project and that was all. Luckily, I had the opportunity during my internship to go out and be a part of the GPS team and see it firsthand. This really gave me an understanding of how the progressed on the excavation side of things, and you can really see the site develop both with your eyes, and on screen with the surveying equipment. We sent out someone with a rover and base to do a topographic map and get all of the elevations on the job before any work has been done, about halfway through the project, and again once the project

is completed. This helps our dirt Project managers know where the job is at and how accurate their bid was. It was also cool to go back after I took all of the elevations and be able to build a 3D model of the site. The best part about doing this task was getting to meet a bunch of the field guys. Everyone meets at the site in the morning instead of at our shop, so putting a face to all the names I was reading got to be difficult. This allowed me to get acquainted with everyone, and it was much easier to talk to them on the phone once I met them face to face.

The second thing I learned during my internship that I did not know before was how to find production rates when bidding pipe, and how important production rates are. I assumed before I started bidding that it was kind of a one shoe fits all and there was a flat rate per foot for each different kind of pipe. I quickly learned that is not the case. You have to look at what kind of soil is being excavated, what city the job is in, how long the run is, how many manholes or other structures there are in each run, how much room is available for equipment to move around, and how deep you are digging. There are so many variables once it comes to pipe, it is impossible to figure a flat rate that will profit on every single job.

The Next thing I learned during my internship was how important soil borings are. We use soil borings before we bid nearly every single one of our jobs for Utilities, asphalt, and excavation. They provide so much information on what soils can stay and what can go when it comes to excavation. Pipe the most important factor of the soil borings is how much clay is there for digging trenches. If it is a sandy silt you must dig your trenches wider due to the fact of how easily it collapses on itself, whereas if you are digging in clay, you can get away with digging more narrow trenches. The soil borings also help when it comes to knowing where water is. One time during my internship, one of our utility estimators was bidding a watermain

running through the field. There must have been an issue with the Geotechnical report because it did not come out until two or three days before the bid was due. Our estimator was practically done with the bid, but once he got the Geotech. And saw how high the water was, he just scrapped the bid.

The fourth thing I learned during my internship was how important personal connections are in the commercial world. There is nothing that helps getting a commercial bid more than have a good relationship with the project manager for the general contractor. I had that conversation many times during my internship, explaining why I should go out of my way to be nice and scratch the generals back. A lot of times they will choose you because they like you even if your price is a little high. Or they will at least call you and tell you where you need to get your number to.

The fifth thing I learned during my internship was how much money is in undesirable sewer and water work. Our pipe estimators go for the jobs nobody wants to do. They are either deep, rocky, or wet most of the time. A senior project manager swears by it because they can put a bunch more profit on the bid since nobody else is bidding it. We had a job in Farmington last year where we drained 40 Feet of a pond ran the utilities through it, then dug it another 60 or so feet because the owners wanted a quarry type swimming hole. That was probably the coolest jobsite I have ever been on. There was approximately 20 pieces of equipment running throughout the site, 5 of them being our biggest Excavators to dig down the pond. That job was also by far our most profitable job.

My internship at Northwest was an awesome experience and I would not have wanted to do it anywhere else. I am glad that I switched into this program, and it got me to where I am

today. I became a full-time estimator project manager in December. I have learned so much in the past 3 years between the classes at MSU and my Internship, there is nowhere else I would rather be right now.