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Subject: Request for Concurrence on Re-evaluated FEIS/Amended ROD
BBP – Johnson Lane Interchange
NCDP-MT 56(55)
CN: 4199007

Dear Lucia Olivera,

Due to availability and type of funding, the Montana Department of Transportation (MDT) will implement Phase I of the Billings Bypass Project as seven separate construction projects. The fifth project to be constructed as part of Phase I is the Johnson Lane Interchange segment. This segment of the Billings Bypass is located within the community of Lockwood, Yellowstone County, Montana. The current project footprint encompasses an area that includes Johnson Lane from the Coulson Road Intersection to approximately 750 feet south of its intersection with Old Hardin Road; Old Hardin Road from the intersection of Rykken Circle to approximately 680 feet east of its intersection with Cole Street; Cole Street approximately 190 feet north of the Old Hardin Road Intersection to its intersection with Becraft Lane; the Becraft Lane/Cole Street Intersection; Interstate 90 (I-90) from approximately 3,660 feet west of the Johnson Lane/I-90 overpass to 3,695 feet east of the overpass, including the eastbound and westbound on and off ramps; and the North Frontage Road from approximately 1,250 feet west of Town Pump to its intersection with Sannon Boulevard. The Johnson Lane Interchange project is located within Sections 19 and 30 of Township 1 North, Range 27 East. A project location map and current footprint (Figure 1) are provided in Attachment 1.

The Billings Bypass Final Environmental Impact Statement (FEIS) was signed by your agency on March 18, 2014, and the Final Record of Decision (ROD) was signed by your agency on July 25, 2014. Additionally, two Revised RODs were prepared in 2019 and 2021 to address design modifications to the Yellowstone River segment and the Railroad Overpass segment of the Billings Bypass Project. The Revised RODs were signed by the Federal Highway Administration (FHWA) on December 18, 2019, and May 13, 2021.

MDT Environmental Services Bureau has reviewed the Johnson Lane Interchange segment, the previously approved FEIS and ROD for the Billings Bypass, the Revised RODs for the Yellowstone and Railroad Overpass segments, the current regulatory requirements, and the current conditions within the Johnson Lane Interchange project footprint. Based on this analysis, MDT concludes that the requirements of both the National and Montana Environmental Policy Acts (NEPA and MEPA) are met for the subject project through a Re-evaluated Environmental Impact Statement (REIS) as described in 23 Code of Federal Regulations (CFR) 771.129(b) rather than a Supplemental Environmental Impact Statement (SEIS) as described in 23 CFR 771.130. However, notable design changes within the Johnson Lane Interchange segment will require an amendment to the ROD, as described in 23 CFR 771.127(b).

The purpose of this letter is to demonstrate MDT NEPA/MEPA compliance by documenting changes to environmental conditions within the current project footprint, design refinements/changes to the Johnson Lane Interchange segment since the 2014 FEIS and ROD and explaining why these differences do not

constitute a "significant" change that would trigger a SEIS as opposed to a REIS. This letter also requests FHWA concurrence that the proposed design for the Johnson Lane Interchange segment and the updated environmental information would not require preparation of a SEIS, but that a Revised ROD would be required in accordance with 23 CFR 771.127(b).

As part of the 2014 Billings Bypass FEIS, five options were developed for the Johnson Lane/I-90 Interchange and associated secondary intersections at Old Hardin Road/Johnson Lane, Old Hardin Road/Becraft, and Johnson Lane/North Frontage Road. A preferred alternative for the Johnson Lane Interchange segment was never determined and outlined in the 2014 Billings Bypass FEIS and ROD. The FEIS and ROD instead stated that the precise configuration of the Johnson Lane Interchange and associated secondary intersections would be determined during final design. For the purpose of impact analysis in the 2014 FEIS and ROD, a maximum potential footprint in which impacts may occur was determined for the Johnson Lane Interchange project. The maximum footprint (i.e., area of potential effect [APE]) outlined in the FEIS included the Johnson Lane/I-90 Interchange and approximately 0.75 mile of I-90 (3,960 feet), the North Frontage Road, Sannon Boulevard, and Johnson Lane from the Coulson Road Intersection to approximately 440 feet south of its intersection with Old Hardin Road. At Old Hardin Road, the APE only extended 450 west of the Johnson Lane Intersection and ended at its intersection with Becraft Lane. Figure 1 in Attachment 1 shows the APE from the 2014 FEIS and ROD versus the current project footprint.

The following re-evaluation discusses new information or circumstances relevant to the development of the Johnson Lane Interchange project and ensures that current environmental requirements are addressed. This re-evaluation focuses on the changes to the design, the amended maximum APE, the potential for new impacts, and new project-related issues that have arisen since approval of the 2014 Billings Bypass FEIS and ROD.

As described in Chapter 1.3 of the FEIS, the purpose of the Billings Bypass project is to improve access and connectivity between I-90 and Old Highway 312 and to improve mobility in the eastern area of Billings. The purpose of and need for the Johnson Lane Interchange project segment of the Billings Bypass has not changed since the approval of the 2014 FEIS and ROD.

DESCRIPTION OF CHANGED CONDITIONS

The Billings Bypass project has been split into seven project segments. Johnson Lane Interchange is the fifth of those segments to be designed. Construction is expected to begin during the 2023 construction season. Since the Billings Bypass ROD in July 2014, there have been design refinements/changes and updated supporting evaluations for the Johnson Lane Interchange segment of the Bypass, including a re-evaluation of the Biological Resources within and adjacent to the proposed Johnson Lane Interchange footprint (revisiting threatened and endangered species, species of concern, and greater sage-grouse); an update to the wetlands evaluation within the proposed footprint; a re-evaluation and updated impact assessment for noise, cultural resources, and hazmat materials/contaminated soils; and an updated review of environmental justice concerns. Additional public involvement has also been conducted since the 2014 ROD was issued. The associated design refinements/changes, environmental changes, and public involvement updates, which are the subject of this re-evaluation, are described below. The overall proposed design for the Johnson Lane Interchange project segment is depicted in Figure 2 found in Attachment 1.

Design Refinement/Change 1: Johnson Lane/I-90 Interchange and Johnson Lane

Five interchange options were developed for the Johnson Lane/I-90 Interchange and associated secondary intersections at Old Hardin Road/Johnson Lane, Old Hardin Road/Becraft, and Johnson Lane/North Frontage Road; however, a preferred alternative was never determined and outlined in the 2014 Billings

Bypass FEIS and ROD. A diverging diamond interchange (identified in the 2014 FEIS and ROD as the double crossover diamond interchange) has been selected as the preferred alternative and carried forward to final design (Figures 2 and 4 in Attachment 1). This interchange alternative was carried forward as it would minimize right-of-way (ROW) impacts, reduce conflict points, eliminate left turns across opposing traffic at the interchange, improve traffic flow, and maintain or enhance access for most of the businesses and properties in the area.

Under the diverging diamond interchange design, the two directions of traffic on Johnson Lane would cross to the opposite side on both sides of the I-90 overpass bridges. The general location of the I-90 westbound and eastbound ramps would be maintained; however, their approach alignments with Johnson Lane would be modified. The off-ramp and crossover sections would be signalized. Johnson Lane through the Johnson Lane/I-90 Interchange would vary between two or three through lanes to accommodate on and off ramps.

At the signalized Johnson Lane and Old Hardin Road Intersection, the proposed lane configuration includes one eastbound through lane, with the option to turn right; two eastbound left-turn lanes onto Johnson Lane; and one westbound through lane for the west leg of Old Hardin Road. One westbound through lane, two westbound designated right-turn lanes onto Johnson Lane, and one westbound left-turn lane onto Johnson Lane are proposed for the east leg of Old Hardin Road. The lane configuration for the south leg of Johnson Lane would include two northbound through lanes, with the option to turn right onto Old Hardin Road; one northbound designated left-turn lane onto Old Hardin Road; and one southbound through lane. The north leg of Johnson Lane would include one southbound through lane, one southbound designated right-turn lane onto Old Hardin Road, two southbound designated left-turn lanes onto old Hardin Road, and two northbound through lanes.

The proposed diverging diamond interchange would require realigning the North Frontage Road further to the north and is outlined below under Design Refinement/Change 2.

Design Refinement/Change 2: North Frontage Road

Under the diverging diamond option (double crossover diamond) outlined in the 2014 FEIS and ROD, the North Frontage Road would have essentially remained on its existing alignment, crossing Johnson Lane at its current location, with a new traffic signal proposed at the intersection.

Under the proposed Johnson Lane Interchange segment, the configuration of the diverging diamond would now extend further to the north along Johnson Lane. Adequate spacing between the North Frontage Road Intersection and the proposed ramp terminals is required in order to accommodate sufficient storage lengths for the proposed turn lanes at the new interchange. This meant shifting the North Frontage Road and Johnson Lane Intersection approximately 450 feet to the north of the existing location. To connect to the new intersection, the North Frontage Road alignment west of Johnson Lane would curve north through the east end of the Town Pump parking lot. The alignment would then curve back east to the new intersection location.

Since the Firth Street residential area is located on the east side of Johnson Lane, several connection/access alternatives for the North Frontage Road east of Johnson Lane were evaluated. Alternatives that were evaluated included:

- Eliminating the eastern North Frontage Road connection to Johnson Lane and connecting the eastern North Frontage Road to the future Billings Bypass alignment via an improved Sannon Boulevard.
- Connecting the eastern segment of North Frontage Road to Johnson Lane at a new signalized intersection with the western segment of North Frontage Road and Johnson Lane.

- Providing a right-in, one-way eastbound connection from Johnson Lane to the eastern segment of North Frontage Road at the current intersection of North Frontage Road and Johnson Lane in conjunction with the approach to use an improved Sannon Boulevard to connect to the future Billings Bypass.
- Connecting the eastern segment of North Frontage Road to Johnson Lane at the new intersection of Johnson Lane and the proposed Billings Bypass alignment.
- Connecting the eastern segment of North Frontage Road to Johnson Lane at a new signalized intersection with the western segment of North Frontage Road and Johnson Lane in conjunction with an improved connection from the North Frontage Road to the future Billings Bypass alignment via Sannon Boulevard.

Connecting the eastern segment of the North Frontage Road to Johnson Lane at a new signalized intersection with the western segment of North Frontage Road and Johnson Lane is the preferred alternative (Figures 2 and 3 in Attachment 1). This alternative was chosen because it maintained the direct connection to North Frontage Road east of Johnson Lane that businesses along that segment of roadway relied upon, particularly commercial truck traffic coming off I-90. The preferred alternative would require realignment of North Frontage Road through the residential area on Firth Street in order to connect with the new intersection. The new North Frontage Road alignment would directly impact five residential structures and one commercial warehouse.

The new North Frontage Road and Johnson Lane Intersection would be a signal-controlled intersection. The lane configuration on North Frontage Road would include two westbound through lanes, with an option to turn right onto Johnson Lane; two designated westbound left-turn lanes onto Johnson Lane; and one eastbound through lane on the east leg of North Frontage Road. One eastbound through lane, one designated eastbound right-turn lane onto Johnson Lane, one designated eastbound left-turn lane onto Johnson Lane, and two westbound through lanes make up the west leg of North Frontage Road. The lane configuration on the south leg of Johnson Lane includes two northbound through lanes, one designated northbound right-turn lane onto North Frontage Road, two designated northbound left-turn lanes onto North Frontage Road, two southbound through lanes, and one designated southbound right-merge lane onto westbound I-90. For the north leg of Johnson Lane, two northbound through lanes, two southbound through lanes, a designated southbound left-turn lane onto North Frontage Road, and a designated southbound right-turn lane onto North Frontage Road are proposed.

The North Frontage Road Realignment (east and west of Johnson Lane) would require approximately 7.5 acres of new ROW. However, the impacts to residential structures east of Johnson Lane may require a total property purchase by MDT. This would be negotiated during ROW discussions.

Design Refinement/Change 3: Old Hardin Road and Becraft Lane Intersection

Under the diverging diamond option (double crossover diamond) outlined in the 2014 FEIS and ROD, the lane configuration at the Old Hardin Road and Becraft Intersection included one eastbound through lane and one eastbound designated right-turn lane onto Becraft Lane. Northbound traffic on Becraft Lane was forced to make a right-turn only onto Old Hardin Road as no left-turn option would be available. This intersection configuration also did not provide a left-turn option for westbound traffic on Old Hardin Road wanting to turn left on to Becraft Lane. A traffic signal was not proposed at this intersection.

Under the proposed Johnson Lane Interchange segment, the lane configuration at the Old Hardin Road and Becraft Intersection includes two eastbound through lanes, with the option to turn right onto Becraft Lane. The designated right-turn only lane for northbound traffic on Becraft Lane has been removed; however, northbound traffic would still be required to turn right, as a left-turn option is not available. A designated left-turn lane for westbound traffic on Old Hardin Road has been included, which allows

traffic to turn left on to Becraft Lane. The intersection would remain unsignalized (Figures 2 and 5 in Attachment 1).

Design Refinement/Change 4: Old Hardin Road and Cole Street Intersection

Under the diverging diamond option (double crossover diamond) outlined in the 2014 FEIS and ROD, a signalized intersection was proposed at Old Hardin Road and Cole Street. The lane configuration on Old Hardin Road included one eastbound through lane with the option to turn right onto Cole Street, one westbound through lane with the option to turn right onto Cole Street, and a designated left-turn lane at the intersection for both east and westbound traffic to turn left onto Cole Street. Cole street would be improved (i.e., widened) south of Old Hardin Road to provide a new connector street to Becraft Lane.

Under the proposed Johnson Lane Interchange segment, the intersection is still proposed as a signalized intersection. The lane configuration on Old Hardin Road would now include one eastbound through lane and one designated eastbound right-turn lane onto Cole Street, two westbound through lanes with the option to turn right onto Cole Street, and a designated left-turn lane at the intersection for both east and westbound traffic to turn left onto Cole Street. Cole street would be improved (i.e., widened) south of Old Hardin to provide a new connector street to Becraft Lane (Figures 2 and 5 in Attachment 1).

Design Refinement/Change 5: Cole Street and Becraft Lane Intersection

The diverging diamond (double crossover diamond) outlined in the 2014 FEIS and ROD included improvements (i.e., widened) to Cole Street, south of Old Hardin Road, that ended in a skewed T-intersection connection at Becraft Lane.

During design refinements for the proposed Johnson Lane Interchange segment, several alternatives were considered for the Cole Street and Becraft Lane Intersection. Alternatives included a T-intersection where Cole Street is stop controlled and Becraft Lane is free-flow (Option 1A), a Y-shaped configuration where Becraft Lane is stop controlled and Cole Street is free-flow (Option 1B), and a mini roundabout (Option 1C).

The preferred alternative for the Cole Street and Becraft Lane Intersection is Option 1B, because Cole Street traffic would have a continuous connection with the east segment of Becraft Lane and the Old Hardin Road and Cole Street intersection. The proposed Y-shaped intersection configuration would include a stop control at the intersection for eastbound traffic on Becraft Lane. Because of the Y-shape configuration, driveways to homes south of Becraft Lane would be extended to meet the new intersection alignment.

Improvements to Cole Street and to the Cole Street and Becraft Lane Intersection would require approximately 0.725 acre of new ROW (Figures 2 and 5 in Attachment 1).

Design Refinement/Change 6: Updated Project Footprint

As indicated in the 2014 FEIS and ROD, the maximum potential footprint in which impacts may occur for the Johnson Lane Interchange segment included the Johnson Lane/I-90 Interchange and approximately 0.75 mile of I-90 (3,960 feet), the North Frontage Road, Sannon Boulevard, and Johnson Lane from the Coulson Road Intersection to approximately 440 feet south of its intersection with Old Hardin Road. At Old Hardin Road, the APE only extended approximately 450 west of the Johnson Lane Intersection and ended at its intersection with Becraft Lane.

To accommodate the new design features now included in the Johnson Lane Interchange segment, the footprint, in which impacts may occur (i.e., the APE), was updated from what was shown in the 2014 FEIS and ROD. The APE along Johnson Lane now extends from the Coulson Road Intersection to

approximately 750 feet south of its intersection with Old Hardin Road. The APE along Old Hardin Road now extends from the intersection of Rykken Circle to approximately 680 feet east of its intersection with Cole Street. Cole Street, from approximately 190 feet north of the Old Hardin Road Intersection to its intersection with Becraft Lane, and the Becraft Lane and Cole Street Intersection are now included. The APE along I-90 is extended from approximately 3,660 feet west of the Johnson Lane/I-90 overpass to 3,695 feet east of the overpass, including the eastbound and westbound on and off ramps. The APE surrounding the North Frontage Road and Sannon Boulevard remains relatively the same. Figure 1 in Attachment 1 shows the APE from the 2014 FEIS and ROD compared to that of the current project footprint.

This updated footprint is the area that was evaluated for the documentation of changes to the environmental conditions as well as any updates to the supporting environmental evaluations.

Design Change 7: Sannon Boulevard

A new alignment and profile for Sannon Boulevard was considered from the North Frontage Road to Coulson Road as part of the Johnson Lane Interchange project. The new alignment and profile would include two, long s-curves to decrease the maximum grade (a decrease of 4.54%) and flatten the horizontal curves. The roadway profile would include two 12-foot travel lanes with 2-foot shoulders. The proposed alignment was meant to provide access improvements for vehicles, particularly for large trucks, that may use Sannon Boulevard as a connector between the North Frontage Road and Coulson Road. This alignment would also impact a small segment of the Coulson Ditch. This proposed alignment was presented during public meetings that took place in 2020 and 2021.

In April 2022, MDT determined that the proposed Sannon Boulevard improvements were no longer warranted as the proposed realignment of the North Frontage Road would provide more suitable access/connectivity to Coulson Road and the future Railroad Overpass to Johnson Lane segment of the Billing Bypass. In addition, approximately one-third of the proposed Sannon Boulevard improvements would need to be obliterated and then connected to the Billings Bypass when the Railroad Overpass to Johnson Lane segment is constructed. For these reasons, Sannon Boulevard was removed from the Johnson Lane Interchange project; MDT will no longer be impacting the Coulson Ditch at this location. A letter, dated April 29, 2022, was provided to property owners within the vicinity of Sannon Boulevard notifying them of the proposed design change.

Environmental Change 1: Biological Resources Update

Threatened and Endangered Species and State Species of Concern

A Final Biological Resources Report/Biological Assessment (BRR/BA) was completed for the Billings Bypass EIS in November 2011. Two addenda to that report were completed in June 2012 and August 2013. The 2011 BRR/BA Report and the 2012 report addendum served as a basis for informal consultation with the US Fish and Wildlife Service (USFWS) concerning potential effects of future Billings Bypass projects on federally listed species. In a letter dated July 26, 2012, the USFWS concurred with MDT's determination that the Billings Bypass project is not likely to adversely affect whooping crane (*Grus Americana*), would have ***No Effect*** on the black-footed ferret (*Mustela nigripes*), and is ***Not Likely to Jeopardize the Existence*** of the greater sage-grouse (*Centrocercus urophasianus*) and Sprague's pipit (*Anthus spragueii*). The August 2013 addendum was completed to confirm there had been no changes to the USFWS Yellowstone County list of threatened and endangered species since the 2012 addendum and confirm the USFWS determination was still current.

Due to the Billings Bypass project now being split into seven construction projects, and due to the time lapse since the August 2013 addendum, BRR/BA Addendum Reports are being prepared for each project segment as updates to the original BRR/BA and addenda. A BRR/BA Addendum Report was completed

for the Johnson Lane Interchange segment on March 4, 2022. According to the Johnson Lane Interchange Addendum Report, the greater sage-grouse, black-footed ferret, and Sprague's pipit have been removed from the October 2021 list of endangered, threatened, proposed, and candidate species for Yellowstone County. Red knot (*Calidris canutus rufa*) and monarch butterfly (*Danaus plexippus*) have been added to the Yellowstone County list. Red Knot was listed on January 12, 2015, and monarch butterfly was designated as a candidate species on December 15, 2020. Whooping crane remains on the list.

The 2022 report also states that there are no records of whooping crane or red knot breeding in the state. They are known to migrate through Montana on occasion in the spring and fall as they head to breeding territories in northern Canada and the Arctic, respectively. There are three observations for whooping crane within a 30-mile radius of the proposed Johnson Lane Interchange project over the last 100 years. The nearest observation was documented more than 10 miles to the northeast as a fly-over in April 2010. One observation of red knot is documented less than a mile northwest of the proposed Johnson Lane Interchange project limits. This individual was a transient (non-breeding and short-term) documented in 1975 and not seen since. Two other red knot observations in the general geographic area are greater than 30 miles from the project vicinity.

Monarch butterflies migrate through Montana in the spring and fall as they move between central Mexico and Canada. While monarch butterflies may migrate through the area, suitable foraging and resting habitat is limited within the Johnson Lane Interchange segment footprint. According to the Montana Natural Heritage Program (MTNHP), the closest recorded observation of a monarch butterfly was over 30 miles southwest of the project limits in 2016. In addition, migrating monarchs do not typically arrive in Montana until June or July. Construction on the Johnson Lane Interchange project would likely start, and the vegetation would be removed, prior to their arrival.

Neither the whooping crane nor red knot would be anticipated in the Johnson Lane Interchange project area, as limited-to-no-appropriate habitat is present. Therefore, a ***No Effect*** determination has been made for the proposed Johnson Lane Interchange project activities for both whooping crane and red knot. Additionally, the monarch butterfly is not anticipated in the project area due to limited habitat and timing of construction. Therefore, the Johnson Lane Interchange project ***Would Not Jeopardize the Continued Existence*** of the monarch butterfly.

The Johnson Lane Interchange 2021 addendum includes an updated state Species of Concern recorded occurrence list from MTNHP and updated data on bald eagle nests in the area. The 2021 list identified 13 wildlife Species of Concern and one plant Species of Concern within three miles of the Johnson Lane Interchange project. Eleven of these Species of Concern were discussed in the 2011 BRR/BA and 2014 FEIS. No additional impacts or concerns related to the 11 original species have been identified since the 2011 BRR/BA and 2014 FEIS. Of the remaining two wildlife species and one plant species not discussed in the 2011 BRR/BA and 2014 FEIS, limited suitable habitat is found within the Johnson Lane Interchange project vicinity for these species. Permanent vegetation impacts would occur within the proposed construction limits, with both upland and wetland habitat being impacted; however, with much of the project footprint already developed, these impacts would be minor. Direct mortality to some species may occur due to inability to disperse during construction. Temporary noise related impacts would also occur during construction.

The 2020 Montana Fish, Wildlife, and Parks (FWP) observation data on bald eagles shows several documented occurrences of bald eagle and bald eagle nests along the Yellowstone River corridor; however, no bald eagle nests or occurrences have been documented within 0.5 mile of the Johnson Lane Interchange project limits. The MTNHP data shows the closest documented nesting bald eagle was over 0.5-mile northwest of the northern project limits for the Johnson Lane Interchange segment. This nest was last documented in 2006. Additionally, the MTNHP eagle data shows no documented occurrences of golden eagles or golden eagle nests within three miles of the project's footprint. Therefore, additional

minimization measures and timing restrictions for the Johnson Lane Interchange segment are not proposed.

The Johnson Lane Interchange Addendum to Final Biological Resource Report/Biological Assessment dated March 4, 2022, is included in Attachment 2. MDT concludes that the impacts of the Johnson Lane Interchange project on sensitive species are consistent with the findings of the FEIS and ROD.

Greater Sage Grouse

On September 22, 2015, USFWS determined that the protection for the greater sage grouse under the Endangered Species Act was no longer warranted and withdrew the species from the candidate species list. In Montana, the state has management authority over sage grouse as outlined under the 2015 Greater Sage Grouse Stewardship Act and Montana Governor's Executive Orders 10-2014, 12-2015, and 21-2015. The Sage Grouse Habitat Conservation Program was created to facilitate implementation of the Executive Orders. State actions implemented by MDT in designated greater sage-grouse habitat must comply with the conservation program.

The Johnson Lane Interchange project segment is not within greater sage-grouse designated core habitat, connectivity habitat, or general habitat. The nearest designated sage grouse habitat, which is general habitat, is approximately 2.8 miles northwest of the proposed segment. The Johnson Lane Interchange project activities are consistent with the Montana Sage Grouse Conservation Strategy.

Wetlands

A wetland delineation was completed in 2011 as part of the developing Billings Bypass EIS. As more than 10 years have passed since the original wetland delineation was conducted, and to ensure all wetlands were identified within the current design footprint for the Johnson Lane Interchange segment, a wetland delineation following US Army Corps of Engineers (USACE) delineation guidelines was conducted in September 2020. During the 2020 wetland delineation effort, the 2011 wetland boundaries were updated to current conditions. Two irrigation ditches, the Coulson Ditch and the Lockwood Ditch, were identified within the current Johnson Lane Interchange footprint, and one additional wetland, a fringe wetland along the Lockwood Ditch, was also delineated. In the 2011 delineation, Coulson Ditch was delineated entirely as wetland (Wetland S). During the 2020 delineation effort, the Coulson Ditch was reviewed within the project limits for wetland indicators. Water was not flowing in Coulson Ditch, and the ditch appeared to have not conveyed flows for a very long time. The bed and bank of the ditch were vegetated with upland species. Therefore, this aquatic resource has been updated to a non-wetland irrigation ditch. MDT is avoiding any impacts to the Coulson Ditch as part of this project.

To compare wetland impacts, the 2020 delineated wetlands and proposed Johnson Lane Interchange project design were reviewed against the wetland impact information presented in the 2014 FEIS and ROD. As outlined in the 2014 FEIS, approximately 0.37 acres of wetland impact was identified for the Johnson Lane Interchange segment. Based on the refinement/changes to the Johnson Lane Interchange project design and the 2020 wetland delineation, the permanent wetland impacts for the Johnson Lane segment have been updated to approximately 0.38 acres. This slight increase in wetland impacts is due to updates to the wetland boundaries, a reduction in the proposed impacts from what was stated in the 2014 FEIS and ROD due to design refinements/changes, and additional new impacts to the fringe wetland that was identified during the 2020 field delineation. The difference for the purposes of comparing impacts is minor and would not alter the conclusions in the FEIS and ROD.

A Clean Water Act Section 404 permit from the USACE will be required for impacts to wetlands and other aquatic resources considered waters of the United States. It is expected that the authorization from USACE will be under a Nationwide Permit. Potential wetland impacts require compensatory mitigation in accordance with applicable USACE regulations and Executive Order 11990. Wetland mitigation may

occur in the form of credits from one of MDT's wetland mitigation reserves, purchasing credits from a wetland mitigation bank, in-lieu fee credits, or developing on-site wetland restoration, enhancement, or creation.

The 2020 delineated wetlands are found in the Johnson Lane Interchange BRR/BA Addendum Report included in Attachment 2. MDT concludes that the impacts of the Johnson Lane Interchange project on wetlands are consistent with the findings of the FEIS and ROD.

Environmental Change 2: Noise Analysis Update

A Final Traffic Noise Impact Assessment was completed during the development of the Billings Bypass EIS in March 2012. In the 2012 noise report and 2014 FEIS and ROD, only noise-sensitive receptors north of the Johnson Lane/I-90 Interchange were assessed for potential noise impacts. This included 12 receptors within and directly adjacent to Johnson Lane Interchange project footprint. The 2012 noise report and 2014 FEIS and ROD identified six of those receptors where noise impacts were predicted from construction of the Johnson Lane Interchange project and the subsequent Railroad Overpass to Johnson Lane segment of the Billings Bypass. The noise report, FEIS, and ROD concluded that no feasible or reasonable mitigation measures were found for the impacts associated with the Johnson Lane Interchange project. Coordination between local officials and developers was suggested to require setbacks for future developments or the development of noise-compatible uses near the roadway.

Due to refinements/changes to the project scope and updates to the project footprint for the Johnson Lane Interchange segment, a Detailed Noise Analysis Report was completed in December 2021. The December 2021 report updates the March 2012 noise report for Johnson Lane Interchange and includes traffic noise analysis for additional noise-sensitive receptors found south of the Johnson Lane / I-90 Interchange, along Old Hardin Road, and at the Cole Street and Becraft Lane intersection, that were not included in the 2012 report. The 2021 report also revisits noise impacts to those noise receptors north of I-90 due to the realignment of the North Frontage Road.

The 2021 Johnson Lane Interchange Detailed Noise Report identified 51 noise-sensitive receptors within 500 feet of the closest proposed travel lane for the Johnson Lane Interchange segment. This includes 38 noise-sensitive receptors south of the Johnson Lane/I-90 Interchange (along Old Hardin Road, Johnson Lane, and Becraft Lane), 11 of the previously identified noise-sensitive receptors (one mobile home was relocated) north of the Johnson Lane/I-90 Interchange, and two additional receptors north of I-90. The 2021 Detailed Noise Report predicted noise related impacts from construction of the Johnson Lane Interchange project for 10 noise receptors. This includes five residences north of I-90 in the Firth Street residential area and five residences south of Old Hardin Road on Rykken Circle. Predicted impacts to the five receptors north of I-90 are due to the proposed realignment of the North Frontage Road and improvements on Johnson Lane. Three of the receptors along Old Hardin Road are currently noise impacted under existing conditions. Traffic noise impacts are predicted for these same receptors plus an additional two receptors due to improvements along Old Hardin Road.

Similar to the 2012 noise report and the 2014 FEIS and ROD, the 2021 noise report concluded that no feasible or reasonable mitigation measures were found for the impacts associated with the Johnson Lane Interchange segment. Four of the receptors impacted by the North Frontage Road realignment would be relocated, leaving only one impacted receptor. A barrier near the five impacted receptors south of Old Hardin Road would not meet MDT's noise reduction design goals and reasonableness criteria.

The Johnson Lane Interchange Detailed Noise Report dated December 1, 2021, is included in Attachment 3. This report used MDTs older planning cost of $\$40/ft^2$ for determining if noise mitigation is reasonable. MDTs new planning cost for noise mitigation is $\$45/ft^2$. However, an evaluation using the updated higher planning cost did not change the results or findings of the noise study. Therefore, MDT concludes that

noise impacts of the Johnson Lane Interchange segment on noise sensitive receptors and proposed mitigation are consistent with the findings of the FEIS and ROD.

Environmental Change 3: Cultural Resources Update

A Cultural Resources Inventory Report was completed during the development of the Billings Bypass EIS in September 2011. An addendum to that report was completed in 2012. Within the Johnson Lane Interchange APE outlined in the 2011 Cultural Resources Inventory Report, the 2012 report addendum, and the 2014 FEIS and ROD, five historic building properties and one irrigation ditch were identified north of the Johnson Lane/I-90 Interchange. These properties were determined not eligible for listing on the National Register of Historic Places (NRHP). The State Historic Preservation Office (SHPO) concurred with this determination on September 12, 2013, and September 16, 2013. No historic properties were noted south of the Johnson Lane/I-90 Interchange, as the APE at that time did not include Old Hardin Road, Cole Street, or Becraft Lane.

Due to refinements/changes to the project scope and updates to the project footprint for the Johnson Lane Interchange segment, a Class III Cultural Resources Inventory was completed in January 2021 for the updated Johnson Lane Interchange project APE south of the Johnson Lane/I-90 Interchange, along Old Hardin Road, and for Sannon Boulevard (along the proposed alignment). An additional Class III Cultural Resources Inventory was completed in November 2021 along the updated APE for the North Frontage Road Realignment and for the improvements at the Cole Street and Becraft Lane Intersection. These 2021 reports also updated the previously recorded sites found within the original APE.

Nine historic building properties (residences) and two irrigation ditches (the Coulson Ditch and the Lockwood Ditch) were documented within the updated APE as part of the January and November 2021 inventories. All 11 historic sites were determined not eligible for listing on the NRHP. A twelfth site that was previously recorded, the Myaer Farm (24YL0641) was also noted in the APE. This site was previously determined as eligible for listing on the NRHP; however, this site was destroyed when the Flying J Travel Plaza was constructed. Therefore, MDT recommended that this site's status be revised to not eligible as it no longer exists. SHPO concurred with the updated ineligibility determination for the Myaer Farm on December 27, 2021. The remaining 11 sites within the APE also are, or remain, ineligible for listing on the NRHP. SHPO concurred with these eligibility determinations on December 27, 2021. SHPO concurrence is found in Attachment 4.

Environmental Change 4: Hazardous Materials and Air Quality Update

During development of the Billings Bypass EIS, an Initial Site Assessment (ISA) was performed in 2011 to identify hazardous materials/substances that could be affected by ground disturbance associated with the proposed project. According to the 2011 ISA and the 2014 FEIS, eight hazardous sites were identified within the Johnson Lane Interchange project footprint. These sites include:

- Underground storage tank (UST) and spill (sewage and diesel) at Town Pump Pilot Truck Stop (North Frontage Road)
- Above ground storage tank (AST) at residence (Firth Street)
- AST at residence (west of Sannon Boulevard)
- UST, leaking UST (LUST), and spill (oil) at Flying J Travel Plaza (Old Hardin Road)
- UST and LUST at Casey's Corner Store (Old Hardin Road)
- Electrical substation (Johnson Lane)
- Spill (oil) at Fly in Lube (Johnson Lane)

The 2014 FEIS and ROD included potential impacts associated with construction activities at or near the Flying J Travel Plaza and Casey's Corner Store. This included the presence of contaminated soils. Mitigation outlined in the FEIS and ROD included a Phase II assessment, including surface soil, subsurface soil, and groundwater samples, to determine probable contaminants of concern. Asbestos surveys were also included as part of the mitigation for structures removed during construction.

Since the 2014 FEIS and ROD, the required Phase II and asbestos survey mitigation has been completed. The results of those efforts and any updates to hazardous materials impacts are described below.

Due to the potential presence of contaminated soils within the Johnson Lane Interchange construction limits, a Billings Bypass Subsurface Investigation Report was completed for the Johnson Lane Interchange project segment in January 2021. Subsurface investigations were completed with the MDT ROW near three underground storage tanks where leaks/spills had previously occurred or may have occurred. These included the Town Pump Pilot Truck Stop, the Flying J Travel Plaza, and Casey's Corner Store. The results of the subsurface investigation indicated no soil impacts above Montana Department of Environmental Quality Risk-Based Screening Levels were identified during the investigation for extractable petroleum hydrocarbon and volatile petroleum hydrocarbon. Further investigation of potential petroleum impacts is not warranted, and no additional mitigation is proposed.

An Asbestos Survey report for the Johnson Lane/I-90 overpass bridges was completed in February 2021. The survey was conducted to identify potential hazardous materials (asbestos) that may be present in the bridge building materials prior to the demolition of the bridges. The results of the survey indicated no asbestos was detected in any of the suspect materials samples. No additional mitigation is proposed.

The Johnson Lane Interchange Subsurface Investigation Report dated January 26, 2021, and the Asbestos Survey of the Johnson Lane Interchange Bridges dated February 12, 2021, are included in Attachments 5 and 6. The results from these studies would not alter the conclusions in the FEIS and ROD.

One additional impact was identified since the 2014 FEIS and ROD within the Johnson Lane Interchange segment footprint. With the proposed design change to the North Frontage Road, which includes a realignment further to the north, the AST associated with the residence on Firth Street would likely be impacted. The mitigation outlined in the 2014 FEIS and ROD related to AST impacts is still valid.

The updated project footprint was also compared to the extents of the Billings Carbon Monoxide Maintenance Area. The updated footprint is east of and remains entirely outside the boundaries of the Billings Carbon Monoxide Maintenance Area. As such, additional coordination with DEQ and EPA is not required. There are no changes to the mitigation outlined in the 2014 FEIS and ROD related to air quality.

MDT concludes that both the hazardous materials and air quality impacts and their proposed mitigation outlined for the Johnson Lane Interchange project are consistent with the findings of the FEIS and ROD.

Environmental Change 5: Environmental Justice Update

The Johnson Lane Interchange project limits are located within Block Groups 1, 2, and 3 of Census Tract 8. The 2014 FEIS and ROD provided census data information for populations below the poverty level and minority populations to assess whether the Billings Bypass project would have disproportionately high or adverse human health and environmental effects on these populations. According to the 2014 FEIS and ROD, a slightly higher Hispanic population percentage was identified in Block Group 3 of Census Tract 8; however, it was not notably higher than the percentages for the community of Lockwood, the City of Billings, or Yellowstone County. Low-income populations, which were assessed at the Census Tract level, did not show a higher population concentration for Census Tract 8. The 2014 FEIS and ROD concluded that no disproportionately high and adverse impacts to Environmental Justice populations were

anticipated.

Because of the refinements/updates to the Johnson Lane Interchange project design, particularly the realignment of North Frontage Road through the Firth Street residential area, the 2020 Decennial U.S Census data and the 2019 American Community Survey (ACS) 5-year estimates were reviewed to determine if substantial changes to low income or minority population characteristics in the project area had occurred since the 2014 FEIS and ROD. The following tables outline minority population statistics and low-income population statistics within the Johnson Lane Interchange project area. Minority population data could be ascertained from the 2020 Census data at the Block Group level (Block Groups 1, 2, and 3 within Census Tract 8). Low-income populations, however, are not provided in the current 2020 data or at the Block Group level. Therefore, the ACS 2019 five-year estimates for Census 8 were used.

Minority Populations

	Total Population	***White***	***African American***	***Native American***	***Asian***	***Native Hawaiian or Pacific Islander***	***Hispanic or Latino***	***Other***
BG1/CT8	1,115	918/ 82%	7/0.6%	66/5.9%	7/0.6%	0/0%	74/6.6%	24/ 2.2%
BG2/CT8	1,600	1,315/ 82%	10/0.6%	101/6.3%	2/0.1%	2/0.1%	105/6.6%	38/ 2.4%
BG3/CT8	1703	1,455/ 85%	13/0.8%	60/3.5%	6/0.4%	0/0%	103/6.0%	39/ 2.3%
Lockwood	7,195	6,635/ 92%	33/0.5%	408/5.7%	27/0.4%	4/0.1%	468/6.5%	130/ 1.8%
Billings	117,116	97,840/84%	1,148/ 1.0%	5,788/ 4.9%	1,087/ 0.9%	205/0.2%	7,937/ 6.8%	2,256/1.9%
Yellowstone County	164,731	139,965/ 85%	1,309/ 0.8%	7,226 /4.4%	1,320/ 0.8%	232/0.1%	10,115/ 6.4%	2,841/1.7%

2020 Decennial Census data (data.census.gov/cedsci/table)

Populations Below Poverty Level

	Total Population*	***Below Poverty Level***
Census Tract 8	5,391	882 / 16.4%
Lockwood	7,968	1,027 / 12.9%
Billings	106,471	10,652 / 10%
Yellowstone County	155,174	15,199 / 9.8%

2019 ACS 2014-2019 five-year estimates (data.census.gov/cedsci/table)

According to the 2020 census data, the percentages of minority populations for Block Groups 1, 2, and 3 of Census Tract 8 are consistent with the percentages for the community of Lockwood, city of Billings, and Yellowstone County. No notable differences in percentages were identified. Based on the census data provided, there are no relative concentrations of minority populations identified within the Johnson Lane Interchange project area.

For low-income populations, the percentage for Census Tract 8 (16.4%) was slightly higher than the percentages for the community of Lockwood (12.9%), the City of Billings (10%), and Yellowstone County (9.8%). This percentage, however, is not meaningfully higher than the percentages for the

comparison populations and is not great enough to indicate a relative population concentration. Based on the data evaluated, no relative concentrations of residents below the poverty level were identified.

As part of the proposed Johnson Lane Interchange project, the North Frontage Road would be realigned further to the north. This would require a realignment of the road through the Firth Street residential area. Through this realignment, approximately five residences and one commercial warehouse would be directly impacted. The access drive to another residence would also be impacted. Census data provides a general overview of the attributes of a larger subject population. The data associated with small subpopulations, however, within the boundaries of these same areas (i.e., the residential area on Firth Street) may be diluted to such a point that the data is not representative of the subpopulation. During data collection for the Johnson Lane Interchange project, residents along Firth Street were contacted and properties were reviewed. Designated low-income housing units were not identified in Firth Street area. None of the available information suggests that the proposed displacement of residences on Firth Street would impact a low-income or minority population. Therefore, the Johnson Lane Interchange project would not result in disproportionately high and adverse effects on minority or low-income populations.

MDT concludes that the Environmental Justice assessment and proposed mitigation outlined for the Johnson Lane Interchange project are consistent with the findings of the FEIS and ROD.

Public Involvement Update

Public informational meetings for the Billings Bypass project were conducted on September 27 and 28, 2017, July 2, 2020, and November 9, 2021. The intent of the informational meetings was to provide an update to the public on project schedule, project phasing (i.e., the Bypass being split into six project segments), and design refinements. The Johnson Lane Interchange project was included as part of these meetings, particularly the July 2, 2020, and November 9, 2021, meetings, which provided information on the diverging diamond interchange concept, the realignment of the North Frontage Road, proposed improvements to Sannon Boulevard and Old Hardin Road, and the new intersection configuration at Cole Street and Becraft Lane. The public was encouraged to provide comments/input at the meetings or to submit a comment via mail, email, or through the Billings Bypass project website.

The September 2017 meetings were conducted in a public open house format. The September 27, 2017, meeting took place at Independent Elementary School located on US 87 to accommodate the public located north of the Yellowstone River. The September 28, 2017, meeting took place at Eileen Johnson Middle School in Lockwood to accommodate the public located south of the Yellowstone River. The two July 2, 2020, meetings (at 11:00 am and 5:30 pm) were conducted online via a Zoom webinar due to the Covid-19 pandemic. The November 9, 2021, public informational meetings included a Zoom webinar (at 2:00 pm) and public open house at the Metra Park Montana Pavilion (from 5:30 pm to 7:30 pm). Additional public outreach materials included postcards, display ads in the Billings Gazette and Yellowstone County News, and press releases.

Approximately 71 comments specific to the Johnson Lane Interchange segment of the bypass project were received during and following the September 2017, July 2020, and November 2021 public information meetings. Issues, concerns, and opportunities noted in those comments include the following.

- Accommodations for pedestrians and bicyclists within the diverging diamond interchange design.
- Sidewalk extensions along Johnson Lane and Old Hardin Road.
- Business opposition to medians on Old Hardin Road.
- Concerns regarding the local community's understanding of how to use a diverging diamond interchange.

- The design of the diverging diamond accommodating large trucks.
- Sannon Boulevard improvements and ROW impacts to adjacent landowners.
- Impacts to adjacent landowners from improvements on Johnson Lane.
- Access to North Frontage Road and the businesses along the North Frontage Road.
- Impacts to properties on Firth Street due to the Frontage Road Realignment and improvements on Johnson Lane.
- Temporary access concerns for businesses and residences during construction.
- Permanent access changes for businesses and residences once the project is complete.
- The decision for signalized intersections versus roundabouts.
- A general excitement for a different type of interchange (i.e., diverging diamond).

In addition to the public meetings, an April 29, 2022, letter was provided to property owners in the vicinity of Sannon Boulevard notifying them that improvements to Sannon were no longer proposed as part of the Johnson Lane Interchange project. No comments were received.

Personal contacts with adjacent landowners explaining the work to be performed will be offered during the right-of-way phase for the Johnson Lane Interchange project.

RE-EVALUATION

The scope of this re-evaluation includes updated design/environmental information. This re-evaluation includes a review of the Billings Bypass 2014 FEIS and the 2014 ROD for changes in previously identified environmental resources, impacts, and mitigation commitments associated with the environmental changes.

Resource Category Re-Evaluation

The following resource categories were previously examined in the Billings Bypass FEIS and have been re-evaluated in the context of the Johnson Lane Interchange project as currently proposed and, where applicable, new or updated information is provided. Table 1 provides an overview of the resource category and whether a change in impact or a change in mitigation has occurred within the Johnson Lane Interchange footprint. Resource categories with changed conditions are described in greater detail below.

Table 1. Re-evaluation of Resource Categories

Resource Category	Change in Impact? Yes/No	Change in Mitigation? Yes/No	Discussion
Traffic Operations	No	No	No additional impacts to or concerns related to traffic operations have been identified since the FEIS/ROD. As part of the Johnson Lane Interchange project, the North Frontage Road would be realigned further to the north. This was done to maintain traffic operations at the Johnson Lane/I-90 Interchange as discussed in the FEIS and ROD.
Access	Yes	No	The realignment of the North Frontage Road would still maintain direct access to residents and businesses along this roadway. Design changes at the Becraft Lane and Cole Street intersection would also maintain/enhance accessibility for vehicles traveling along these routes. These changes would not alter the conclusion in the FEIS/ROD and is consistent with the findings in the FEIS/ROD. No other concerns related to access have been identified since the FEIS/ROD.
Safety	No	No	No additional impacts to or concerns related to safety have been identified since the FEIS/ROD.
Pedestrian and Bicycle Considerations	Yes	No	A slight change in pedestrian and bicycle safety has occurred since the FEIS/ROD. Accommodations for pedestrians and bicyclists would be made as part of the diverging diamond interchange design. Pedestrians would be routed via the signalized crossovers to raised center medians for traveling through the interchange area. Bike lanes would also be provided for bicyclists adjacent to the raised center medians. This change would not alter the conclusion in the FEIS/ROD and is consistent with the findings in the FEIS/ROD.
Land Use	No	No	No changes in land use have occurred since the FEIS/ROD.
Parks and Recreation	No	No	No additional parks or recreational facilities have been identified within the proposed Johnson Lane Interchange footprint.

Resource Category	Change in Impact? Yes/No	Change in Mitigation? Yes/No	Discussion
Social	No	No	The social conditions described in the FEIS are based on 2010 Census data. 2020 Decennial Census Data and 2019 American Community Survey data related to population, income, and race were reviewed. There have been no substantial changes in social characteristics within the Johnson Lane Interchange project area since the FEIS. Any subtle changes in project area demographics would not affect the overall findings made in the FEIS/ROD.
Economic	No	No	No change to the economic conditions has been identified since the FEIS and ROD.
Environmental Justice	No	No	2020 Decennial Census Data and 2019 American Community Survey data related to low-income and minority populations were reviewed. There have been no substantial changes in environmental justice characteristics within the Johnson Lane Interchange project area since the FEIS. Any subtle changes in project area demographics would not affect the overall findings made in the FEIS/ROD. Additionally, none of the available information suggests that the proposed displacements of residence on Firth Street would impact a low-income or minority population. Therefore, no potential impacts have been identified since the FEIS/ROD that would disproportionately impact low-income or minority populations.
Right-of-Way	Yes	No	The specific ROW requirements for the Johnson Lane Interchange project segment were not outlined in the 2014 FEIS and ROD, which only provided overall ROW impacts for the entire Billings Bypass preferred alternative. The ROW requirements to construct the Johnson Lane Interchange project totals approximately 11.35 acres. This includes 7.5 acres for the North Frontage Road realignment and 0.725 acre for the Cole Street and Becraft Lane Intersection improvements, which are design elements not included in the FEIS and ROD. Five residences and one commercial warehouse would also be directly impacted by the North Frontage Road realignment. This change in ROW impacts would not affect the overall findings and proposed mitigation made in the FEIS/ROD and would not be considered “significant” in terms of context and intensity.
Railroad	No	No	No railroads are located within or adjacent to the Johnson Lane Interchange project segment. No impacts to or concerns with railroads have been identified in the FEIS/ROD for this segment of the Billings Bypass.
Utilities	No	No	Impacts to utilities are consistent with the findings in the FEIS/ROD.

Resource Category	Change in Impact? Yes/No	Change in Mitigation? Yes/No	Discussion
Historic and Cultural Resources	No	No	Due to refinements/changes to the Johnson Lane Interchange project design scope and updates to the project footprint, a Class III Cultural Resources Inventory was completed in January 2021 for the updated Johnson Lane Interchange project APE south of the Johnson Lane/I-90 Interchange, along Old Hardin Road, and for Sannon Boulevard. A second, Class III Cultural Resources Inventory was completed in November 2021 along the updated APE for the North Frontage Road Realignment and for the improvements at the Cole Street/Becraft Lane Intersection. Nine historic building properties and two irrigation ditches were documented within the updated APE as part of the January and November 2021 inventories. All 11 historic sites were determined not eligible listing on the NRHP. A twelfth previously recorded site, the Myaer Farm was also noted in the APE. This site was destroyed when the Flying J Travel Plaza was constructed. Therefore, this site is no longer eligible for the NRHP. SHPO concurred with these 12 eligibility determinations on December 27, 2021 Based on the proposed design, MDT concludes that the Johnson Lane Interchange project would have *No Effect* on significant cultural properties and would not affect the overall findings made in the FEIS/ROD.
Section 4(f) and Section 6(f) Resources	No	No	A Section 4(f) Evaluation was prepared as part of the original FEIS. In addition, an update to the Cultural Resources Survey was also completed in January and November 2021. The Johnson Lane Interchange project would not impact Section 4(f) resources, and there would be no "use" as no Section 4(f) resources were identified in the FEIS and ROD, nor have any been identified since the FEIS and ROD, within the Johnson Lane Interchange project area. The additional historic sites identified during the 2021 cultural resource surveys were all determined as not eligible for listing on the NRHP, and a determination of *No Effect* to these resources was made. No Section 6(f) resources have been identified within the Johnson Lane Interchange project footprint. No change in impacts to Section 4(f) or Section 6(f) resources has occurred since the FEIS/ROD.

Resource Category	Change in Impact? Yes/No	Change in Mitigation? Yes/No	Discussion
Visual Resources	Yes	No	Proposed design changes since the 2014 FEIS and ROD include realigning the North Frontage Road further to the north and through the Firth Street residential area. Moving the frontage road further north would be visually evident to those living along Firth Street, as the roadway would introduce new form, lines, and color within the residential area. These new roadway elements, however, would be consistent with the existing visual character of the surrounding area, the overall visual character that would be created by the Preferred Alternative within the project limits, and the overall visual impact findings made in the FEIS/ROD. The change in visual impacts would not affect the overall findings and proposed mitigation made in the FEIS/ROD and would not be considered "significant" in terms of context and intensity.
Noise	Yes	No	Due to refinements/changes to the Johnson Lane Interchange project design and updates to the project footprint since the 2014 FEIS and ROD, a Detailed Noise Analysis Report was completed in December 2021. The report identified 51 noise-sensitive receptors within 500 feet of the closest proposed travel lane for the Johnson Lane Interchange project. This includes 38 noise-sensitive receptors south of the Johnson Lane/I-90 Interchange (along Old Hardin Road, Johnson Lane, and Becraft Lane), 11 of the previously identified noise-sensitive receptors (one mobile home was relocated) north of the Johnson Lane/I-90 Interchange, and two additional receptors north of I-90. The 2021 detailed noise report predicted noise related impacts from construction of the Johnson Lane Interchange project for 10 noise receptors. This includes five residences north of I-90 in the Firth Street residential area and five residences south of Old Hardin Road on Rykken Circle. Similar to the 2012 noise report and the 2014 FEIS and ROD, the 2021 noise report concluded that no feasible or reasonable mitigation measures were found for the impacts associated with the Johnson Lane Interchange project. Four of the receptors impacted by the North Frontage Road realignment would be relocated, leaving only one impacted receptor. A barrier near the five impacted receptors south of Old Hardin Road would not meet MDT's noise reduction design goals and reasonableness criteria. The change in noise impacts would not affect the overall findings and proposed mitigation made in the FEIS/ROD and would not be considered "significant" in terms of context and intensity.

Resource Category	Change in Impact? Yes/No	Change in Mitigation? Yes/No	Discussion
Farmland	Yes	No	A slight change in farmland impacts has been identified since the FEIS/ROD. As part of the North Frontage Road realignment, the east leg of the frontage road realignment would now cross an agricultural field designated as farmland of statewide importance and prime farmland if irrigated. This would convert approximately 1.05 acre of designated farmland of statewide importance to a transportation use. This change in farmland impacts would not affect the overall findings and proposed mitigation made in the FEIS/ROD and would not be considered "significant" in terms of context and intensity.
Irrigation	Yes	No	Due updates to the Johnson Lane Interchange project footprint since the 2014 FEIS and ROD, a new irrigation ditch, the Lockwood Ditch, has been identified within the project limits. The ditch parallels Old Hardin Road to the south. Improvements to this ditch would include piping approximately 150 linear feet of ditch and culvert extensions. This would impact approximately 0.018 acre of the Lockwood Ditch. MDT is avoiding the Coulson Ditch and there will not be any impacts to the Coulson Ditch as part of this project. This change in irrigation impacts would not affect the overall findings and proposed mitigation made in the FEIS/ROD and would not be considered "significant" in terms of context and intensity.
Energy	No	No	No change in impacts or concerns related to energy has occurred since the FEIS/ROD.
Air Quality	No	No	The updated project footprint remains entirely outside the boundaries of the Billings Carbon Monoxide Maintenance Area. Additional coordination with DEQ and EPA is not required. No change in impacts related to air quality have occurred since the FEIS/ROD.

Resource Category	Change in Impact? Yes/No	Change in Mitigation? Yes/No	Discussion
Hazardous Materials	Yes	No	A review of current the Montana Department of Environmental Quality database was conducted. No additional hazardous materials sites were identified during the review. Since the 2014 FEIS and ROD, the required Phase II and asbestos survey mitigation has been completed. Subsurface investigations were completed with the MDT ROW near three underground storage tanks where leaks / spills had previously occurred or may have occurred. These included the Town Pump Pilot Truck Stop, the Flying J Travel Plaza, and Casey's Corner Store. The results of the subsurface investigation indicated no soil impacts above Montana Department of Environmental Quality Risk-Based Screening Levels for extractable petroleum hydrocarbon and volatile petroleum hydrocarbons. Further investigation of potential petroleum impacts is not warranted, and no additional mitigation is proposed. The asbestos survey indicated no asbestos detected in any of the suspect materials samples. No additional mitigation is proposed. One additional impact was identified since the 2014 FEIS and ROD. With the proposed design change to the North Frontage Road, which includes a realignment further to the north, the AST associated with the residence on Firth Street would likely be impacted. Mitigation outlined in the 2014 FEIS and ROD related to AST impacts is still valid. The change in impact to hazardous materials would not affect the overall findings made in the FEIS/ROD and would not be considered "significant" in terms of context and intensity.

Resource Category	Change in Impact? Yes/No	Change in Mitigation? Yes/No	Discussion
Water Resources and Water Quality	Yes	No	Within the current Johnson Lane Interchange project footprint, two irrigation ditches were identified during the September 2020 wetland delineation. The Coulson Ditch was identified crossing Sannon Boulevard. The Lockwood Ditch parallels Old Hardin Road on the south side of the roadway. MDT is avoiding the Coulson Ditch and there will not be any impacts to the Coulson Ditch as part of this project. Improvements at the Lockwood Ditch include culvert extensions within the ditch and a segment of the ditch being piped (150 linear feet). This would result in approximately 0.018 acre of permanent impact to the Lockwood Ditch. No additional groundwater wells were identified within the project vicinity. The change in impacts to water resources and water quality is consistent with the findings in the FEIS/ROD and would not be considered "significant" in terms of context and intensity.
Wild and Scenic Rivers	No	No	The Johnson Lane Interchange project would not impact a Wild and Scenic River, as the closest river (the Yellowstone River) is not designated as a Wild and Scenic River. No changed conditions have occurred since the FEIS/ROD.
Waterbody Modifications	Yes	No	Within the current Johnson Lane Interchange project footprint, two irrigation ditches were identified during the September 2020 wetland delineation. The Coulson Ditch was identified crossing Sannon Boulevard. The Lockwood Ditch parallels Old Hardin Road on the south side of the roadway. MDT is avoiding the Coulson Ditch and there will not be any impacts to the Coulson Ditch as part of this project. Improvements at the Lockwood Ditch include culvert extensions within the ditch and a segment of the ditch being piped (150 linear feet). This would result in approximately 0.018 acre of permanent impact to the Lockwood Ditch. The change in impacts to waterbodies is consistent with the findings in the FEIS/ROD and would not be considered "significant" in terms of context and intensity.
Floodplains	No	No	The delineated floodplains identified in the FEIS are not within or directly adjacent to the Johnson Lane Interchange project footprint. The Johnson Lane Interchange project would not impact delineated floodplains. No changed conditions have occurred since the FEIS/ROD.

Resource Category	Change in Impact? Yes/No	Change in Mitigation? Yes/No	Discussion
Wetlands	Yes	No	A wetland delineation was completed in 2011 as part of the developing Billings Bypass FEIS. As more than 10 years have passed since the original wetland delineation was conducted and to ensure all wetlands were identified within the proposed footprint for the Johnson Lane Interchange project, a new wetland delineation was conducted in September 2020. As outlined in the 2014 FEIS for the Johnson Lane Interchange segment, approximately 0.37 acre of wetland impact was determined. Permanent wetland impacts as a result of the current Johnson Lane Interchange project design and the updated wetland delineation is approximately 0.38 acre. The slight increase in wetland impacts results from changes in wetland boundaries, a reduction in proposed impacts from what was stated in the FEIS and ROD, and the additional impacts to the fringe wetland identified during the 2020 field delineation. The difference for the purposes of comparing impacts is minor and would not alter the conclusion in the FEIS and ROD. The change in impacts to wetlands is consistent with the findings in the FEIS/ROD and would not be considered "significant" in terms of context and intensity.
Vegetation	No	No	No additional impacts or concerns related to vegetation impacts have been identified since the FEIS/ROD.
Wildlife and Aquatic Resources	No	No	No additional impacts or concerns related to wildlife and aquatic resources have been identified since the FEIS/ROD. The Johnson Lane Interchange project would incorporate special provisions into the final bid package to ensure compliance with the Migratory Bird Treaty Act.

Resource Category	Change in Impact? Yes/No	Change in Mitigation? Yes/No	Discussion
State Species of Concern and Special Status Species	Yes	Yes	A BRR/BA Addendum Report was completed for Johnson Lane Interchange segment on March 4, 2022. The report includes an updated state Species of Concern recorded occurrence list from MTNHP and updated data on bald eagle nests in the area. The MTNHP list identified 13 wildlife Species of Concern and one plant Species of Concern within three miles of the Johnson Lane Interchange project. These include 11 species that were discussed in the FEIS; and two new wildlife species and one plant species, which were not discussed in the FEIS. Of the remaining two wildlife species and one plant species not discussed in the 2014 FEIS, limited suitable habitat is found within the Johnson Lane Interchange project and its vicinity for listed species. Permanent vegetation impacts would occur within the proposed construction limits, with both upland and wetland habitat being impacted; however, with much of the project footprint already developed, these impacts would be minor. Direct mortality to some species may occur due to inability to disperse during construction. Temporary noise related impacts would also occur during construction. 2020 Montana FWP observation data on bald eagles, provided by MTNHP, shows several documented occurrences of bald eagle and bald eagle nests along the Yellowstone River corridor; however, no bald eagle nests or occurrences have been documented within 0.5 mile of the Johnson Lane Interchange project limits. MTNHP data shows the closest documented nesting bald eagle was over 0.5-mile northwest of the Johnson Lane Interchange northern limits. The nest was last documented in 2006. Additionally, MTNHP eagle data shows no documented occurrences of golden eagles or nests within three miles of the project footprint. Therefore, additional minimization measures and timing restrictions for the Johnson Lane Interchange segment are not proposed. The change in impacts to state Species of Concern and Special Status Species are consistent with the findings in the FEIS/ROD and would not be considered “significant” in terms of context and intensity.

Resource Category	Change in Impact? Yes/No	Change in Mitigation? Yes/No	Discussion
Threatened and Endangered Species	Yes	No	A BRR/BA Addendum Report was completed for Johnson Lane Interchange segment on March 4, 2022. According to the report, the greater sage-grouse, black-footed ferret, and Sprague's pipit have been removed from the October 2021 list of endangered, threatened, proposed, and candidate species for Yellowstone County. Red knot and monarch butterfly have been added to the Yellowstone County list. Whooping crane remains on the list. There are no records of whooping crane or red knot breeding in the state. They are known to migrate through Montana on occasion in the spring and fall as they head to breeding territories in northern Canada and the Arctic, respectively. There are three observations for whooping crane within a 30-mile radius of the proposed Johnson Lane Interchange project over the last 100 years. The nearest observation was documented more than 10 miles to the northeast as a fly-over in April 2010. One observation of red knot is documented less than 1.0-mile northwest of the proposed Johnson Lane Interchange project limits. This individual was a transient documented in 1975, and not seen since. Two other red knot observations in the general geographic area are greater than 30 miles from the project vicinity. Monarch butterfly also migrates through Montana in the spring and fall as they move between central Mexico and Canada. While monarch butterflies may migrate through the area, suitable foraging and resting habitat is limited within the Johnson Lane Interchange project footprint. The closest recorded observation of a monarch butterfly was over 30 miles southwest of the project limits in 2016. In addition, during migration, monarchs do not typically arrive in Montana until June or July. The Johnson Lane Interchange project would likely start, and vegetation removed, prior to that arrival. Neither the whooping crane nor red knot would be anticipated in the Johnson Lane Interchange project area, as limited-to-no-appropriate habitat is present. Therefore, a ***No Effect*** determination has been made for the proposed Johnson Lane Interchange project activities for both the whooping crane and red knot. Additionally, the monarch butterfly is not anticipated in the project area due to limited habitat and timing of construction. Therefore, the Johnson Lane Interchange project ***Would Not Jeopardize the Continued Existence*** of the monarch butterfly. The change in impacts to Threatened and Endangered species is consistent with the findings in the FEIS/ROD and would not be considered "significant" in terms of context and intensity.

CONCLUSION

Through this re-evaluation, MDT has determined that no substantive changes within the Johnson Lane Interchange project footprint have occurred since the FEIS and ROD were signed in 2014. The design and environmental updates described in this re-evaluation would not affect the ability of the Johnson Lane Interchange project segment of the Billings Bypass to meet the stated purpose as described in the FEIS and ROD. Additionally, MDT has determined that the impacts of these design and environmental updates are not, individually or cumulatively, significant nor significantly different from those impacts described in the FEIS and ROD. However, a Revised ROD will be required to document the notable design changes within the Johnson Lane Interchange segment, per 23 CFR 771.127(b).

MDT has determined that changes to the design and the environmental updates would have no effect on the ultimate decision documented in the ROD and that approving this updated NEPA/MEPA evaluation and forthcoming Revised ROD for the Johnson Lane Interchange project segment is consistent with 23 CFR 771.

REVIEWED/AUTHORIZED

Date: By Tom Martin at 9:50 am, Aug 24, 2022

Tom Martin, P.E.
Environmental Services Bureau Chief

BRIAN D HASSELBACH Digitally signed by BRIAN D HASSELBACH Date: 2022.09.02 13:48:36 -06'00'

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Montana Legislative Branch Environmental Quality Council (EQC)	

copies: Environmental Services Bureau File

Attachment 1: Project Figures

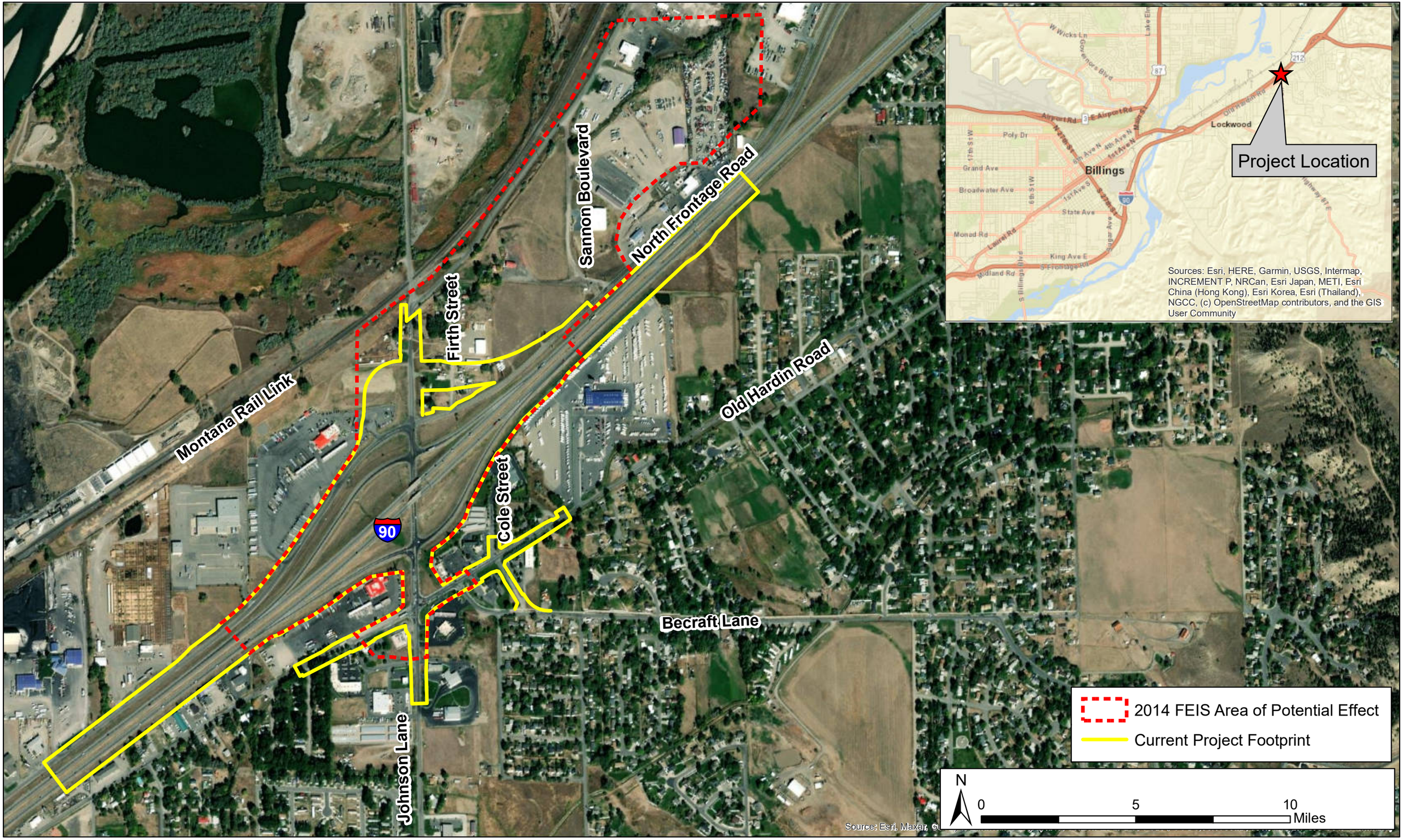


Figure 1

Project Location and Limits

PRELIMINARY

DOWL

FIGURE 2

PROJECT OVERVIEW

BILLINGS BYPASS - JOHNSON LANE INTERCHANGE

IM-CMBL-STPU-NCPD-NHPB 56(53), UPN 4199007

SCALE: 1"=800'

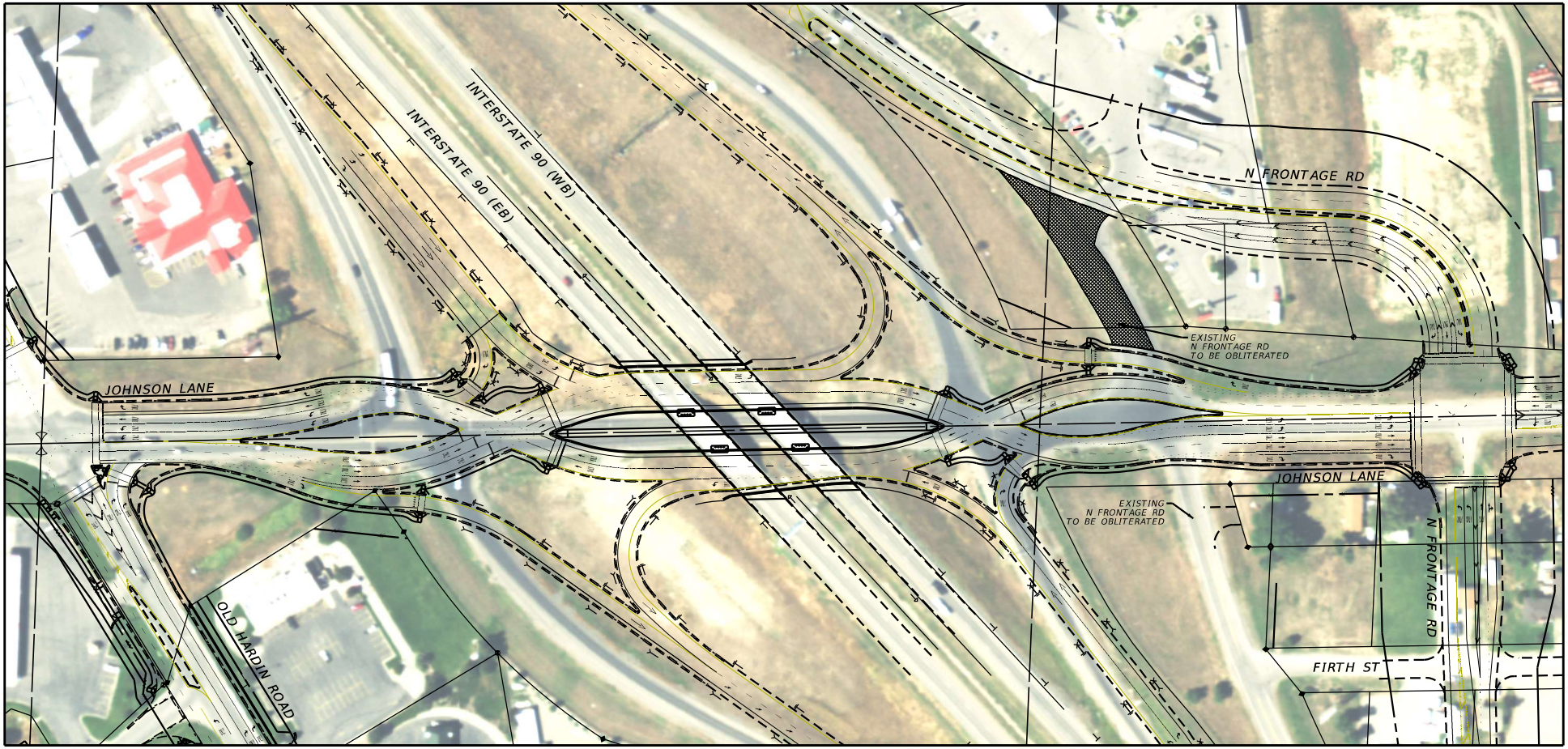
N

PRELIMINARY

DOWL

FIGURE 3

N FRONTAGE RD
BILLINGS BYPASS - JOHNSON LANE INTERCHANGE
IM-CMBL-STPU-NCPD-NHPB 56(53), UPN 4199007
SCALE: 1"=300'



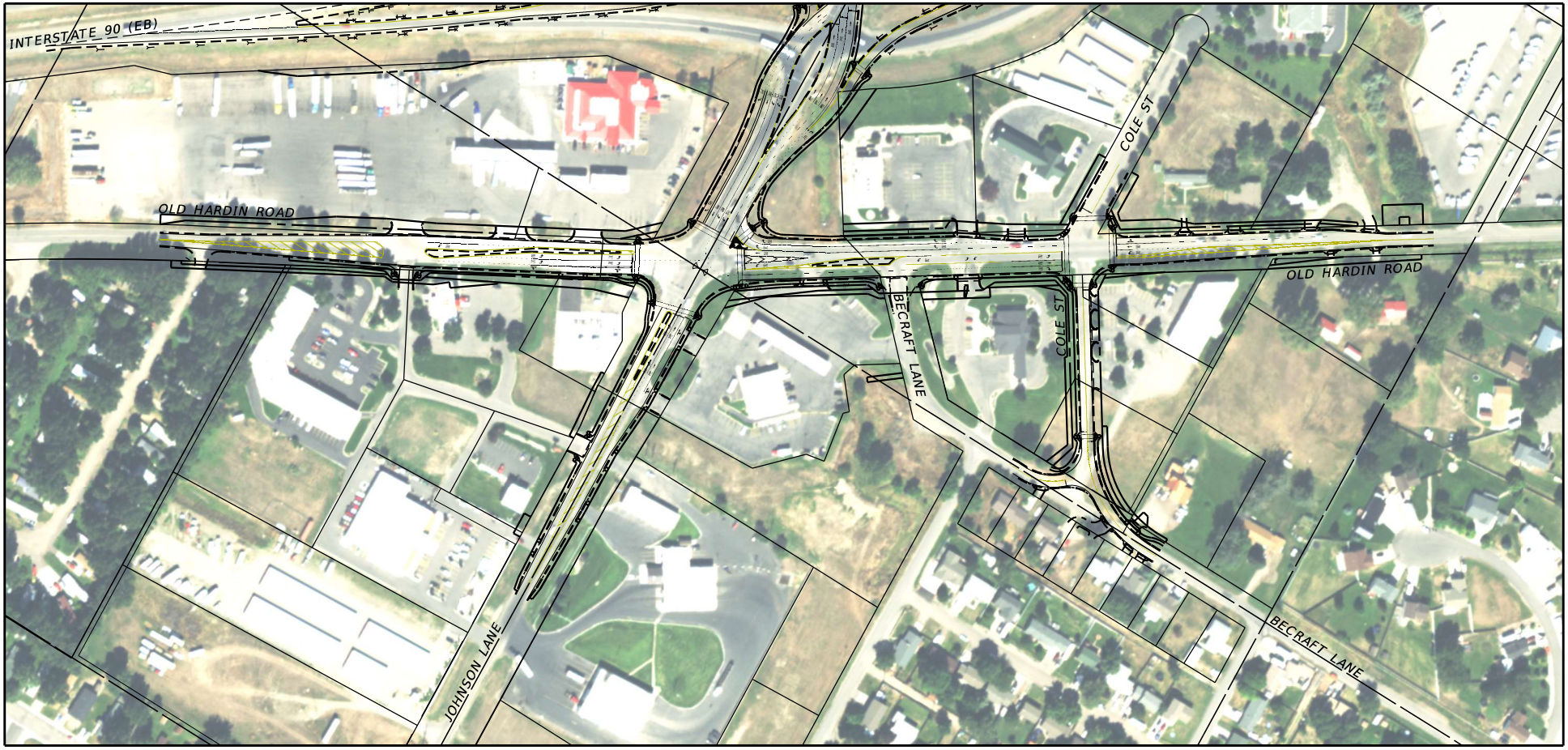
PRELIMINARY

DOWL

FIGURE 4

JOHNSON LANE INTERCHANGE

BILLINGS BYPASS - JOHNSON LANE INTERCHANGE
IM-CMBL-STPU-NCPD-NHPB 56(53), UPN 4199007
SCALE: 1"=150'



PRELIMINARY

DOWL

FIGURE 5

OLD HARDIN RD, COLE ST & BECRAFT LN
BILLINGS BYPASS - JOHNSON LANE INTERCHANGE
IM-CMBL-STPU-NCPD-NHPB 56(53), UPN 4199007
SCALE: 1"=100'

N

Attachment 2: Johnson Lane Interchange BRR/BA Addendum Report

Johnson Lane Interchange Addendum to Final Biological Resources Report / Biological Assessment

MDT Activity 196

BBP – Johnson Lane Interchange
NCDP-MT 56(55)
CN: 4199007

Prepared for:

MONTANA
Department of Transportation

Helena, MT

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FIGURES

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APPENDICES

LIST OF ACRONYMS

BA……..Biological Assessment
BMP……..Best Management Practices
BRR…….. Biological Resources Report
CWA…….Clean Water Act
FEIS……..……Final Environmental Impact Statement
FWP…….. Montana Fish, Wildlife, and Parks
I-90…….. Interstate 90
MDT……Montana Department of Transportation
MTNHP……Montana Natural Heritage Program
NWI…….. National Wetland Inventory
ROD…….. Record of Decision
USACE……United States Army Corps of Engineers
USGS……United States Geological Service
USFWS……United States Fish & Wildlife Service

EXECUTIVE SUMMARY

A Final Biological Resources Report/Biological Assessment (BRR/BA) was completed for the Billings Bypass in November 2011. Two addenda to that report were completed in June 2012 and August 2013. The 2011 BRR/BA Report and the 2012 report addendum served as a basis for informal consultation with the US Fish and Wildlife Service (USFWS) concerning potential effects of future Billings Bypass projects on federally listed species. The August 2013 addendum was completed to confirm there had been no changes to the USFWS Yellowstone County list of threatened and endangered species since the 2012 addendum and confirm the USFWS determination was still current. Impacts to biological resources were also evaluated in the 2014 Billings Bypass Final Environmental Impact Statement (FEIS).

Due to the Billings Bypass project now being split into six construction projects and the time lapse since the August 2013 addendum and 2014 FEIS, BRR/BA Addendums are being prepared for each project segment as updates to the original BRR/BA, addenda, and Billings Bypass FEIS.

This BRR/BA Addendum Report has been prepared for the Johnson Lane Interchange project segment of the Billings Bypass to document changes in the Johnson Interchange project limits and vicinity from what was presented in the November 2011 BRR/BA, subsequent 2012 and 2013 addenda, and the 2014 FEIS. The addendum includes updates to the Johnson Lane Interchange project footprint and project description. It also provides general wildlife and vegetation updates, aquatic resources and wetlands updates, state Species of Concern updates, and updated information on federally threatened and endangered species within the Johnson Lane Interchange project vicinity. The addendum will be included as part of the FEIS Re-evaluation for the Johnson Lane Interchange project segment.

ADDENDUM SUMMARY

As part of the 2014 Billings Bypass FEIS, five options were developed for the Johnson Lane/Interstate 90 (I-90) Interchange and associated secondary intersections at Old Hardin Road/Johnson Lane, Old Hardin Road/Becraft, and Johnson Lane/North Frontage Road. A preferred alternative for the Johnson Lane Interchange project segment, however, was never determined and outlined in the 2014 Billings Bypass FEIS and Record of Decision (ROD). The FEIS and ROD instead stated that the precise configuration of the Johnson Lane Interchange and associated secondary intersections would be determined during final design. For the purpose of impact analysis in the 2014 FEIS and ROD, a maximum potential footprint for the Johnson Lane Interchange project, in which impacts may occur, was determined.

The Johnson Lane Interchange existing conditions within that footprint, along with the avoidance and minimization measures, impacts, and recommended conservation measures described in the 2011 BRR/BA, subsequent 2012 and 2013 addenda, and the 2014 Billings Bypass FEIS are still valid and remain unchanged except as outlined below.

- Refinements/changes to the Johnson Lane Interchange project since the BRR/BA and FEIS include constructing a new diverging diamond interchange at the Johnson Lane/I-90 interchange; shifting the North Frontage Road and Johnson Lane Intersection approximately 450 feet to the north of the existing location to accommodate the new interchange, realigning the North Frontage Road to connect with the new Johnson Lane intersection, alignment and profile improvements to Sannon Boulevard, and intersection improvements at Old Hardin Road/Johnson Lane, Old Hardin Road/Becraft Lane, Old Hardin Road/Cole Street, and Cole Street/Becraft Lane.

- The Johnson Lane Interchange project footprint has been expanded to accommodate the proposed improvements.

- A wetland delineation was completed in 2011 as part of the developing Billings Bypass FEIS. As more than 10 years have passed since the original wetland delineation was conducted, and to ensure all wetlands were identified within the current design footprint for the Johnson Lane Interchange project, a wetland delineation was conducted in September 2020. During the 2020 wetland delineation effort, the 2011 wetland boundaries were updated to current conditions. Two irrigation ditches, Coulson Ditch and Lockwood Ditch, were identified within the current Johnson Lane Interchange footprint, and one additional wetland, a fringe wetland along the Lockwood Ditch, was also delineated. As outlined in the 2014 FEIS, approximately 0.37 acre of permanent wetland impact was determined for the Johnson Lane Interchange segment, with all impacts occurring at Wetland JI-WL2 (previously labeled Wetland T). Permanent wetland impact as a result of the refinement/changes to the Johnson Lane Interchange project design and updated wetland delineation is approximately 0.38 acre. Total wetland impacts only increased slightly (from 0.37 to 0.38 acre) due to the change in acreage delineated for Wetland JI-WL2 from 2011 to 2020 (0.37 acre in 2011 to 0.36 acre in 2020). The additional 0.02 acre of impacts are to the fringe wetland identified during the 2020 field delineation.

- The 2021 state Species of Concern recorded occurrences list from Montana Natural Heritage Program (MTNHP) identified 13 wildlife Species of Concern and one plant Species of Concern within 3.0 miles of the Johnson Lane Interchange Project. Eleven of these Species of Concern were discussed in the 2011 BRR/BA and 2014 FEIS. No additional impacts or concerns related to the 11 original species have been identified since the 2011 BRR/BA and 2014 FEIS. Of the remaining two wildlife species and one plant species not discussed in the 2011 BRR/BA and 2014 FEIS, limited suitable habitat is found within the Johnson Lane Interchange project vicinity for listed species. Permanent vegetation impacts would occur within the proposed construction limits, with both upland and wetland habitat being impacted; however, with much of the project footprint already developed, these impacts would be minor. Direct mortality to some species may occur due to inability to disperse during construction. Temporary noise related impacts would also occur during construction.

- Current 2020 Montana Fish, Wildlife, and Parks (FWP) observation data on Bald Eagles shows documented occurrences of Bald Eagle and Bald Eagle nests along the Yellowstone River corridor; however, no Bald Eagle nests or occurrences have been

documented within 0.5 miles of the Johnson Lane Interchange project limits. MTNHP data shows the closest documented nesting Bald Eagle was over 0.5-miles northwest of the Johnson Lane Interchange northern limits. The nest was last documented in 2006. Additionally, MTNHP eagle data shows no documented occurrences of Golden Eagles or nests within 3.0 miles of the project footprint. Therefore, additional minimization measures and timing restrictions for the Johnson Lane Interchange segment are not proposed. Should a new active nest be constructed and identified within 0.5 miles of the project limits, the Montana Department of Transportation (MDT) District Biologist would be contacted to coordinate with Montana FWP to determine if a timing restriction on construction activities is warranted.

- The Greater Sage-Grouse (*Centrocercus urophasianus*), black-footed ferret (*Mustela nigripes*), and Sprague's Pipit (*Anthus spragueii*) have been removed from the list of endangered, threatened, proposed, and candidate species for Yellowstone County. Therefore, the project effect determinations for these species stated in the 2011 BRR/BA, 2012 addendum, and the USFWS 2012 concurrence letter will remain valid. Monarch butterfly (*Danaus plexippus*) and Red Knot (*Calidris canutus rufa*) have been added to the Yellowstone County list. Whooping Crane (*Grus americana*) remains on the list.

  There are no records of Red Knot or Whooping Crane breeding in the state. Both species are known to migrate through Montana on occasion in the spring and fall as they head to breeding territories in northern Canada and the Arctic, respectively. There are three observations for Whooping Crane within a 30-mile radius of the proposed Johnson Lane Interchange project over the last 100 years. The nearest observation was documented more than 10 miles to the northeast as a fly-over in April 2010. One observation of Red Knot is documented less than 1.0 mile northwest of the proposed Johnson Lane Interchange project limits. This individual was a transient (non-breeding and short-term) documented in 1975, and not seen since. Two other Red Knot observations in the general geographic area are greater than 30 miles from the project vicinity.

  Monarch butterflies also migrate through Montana in the spring and fall as they move between central Mexico and Canada. While monarch butterflies may migrate through the area, suitable foraging and resting habitat is limited within the Johnson Lane Interchange project footprint. According to MTNHP, the closest recorded observation of a monarch butterfly was over 30 miles southwest of the project limits in 2016. In addition, during migration, monarchs do not typically arrive in Montana until June or July. The Johnson Lane Interchange project would likely start, and vegetation removed, prior to that arrival.

  Neither the Whooping Crane nor Red Knot would be anticipated in the Johnson Lane Interchange project area, as limited-to-no-appropriate habitat is present. Therefore, a ***no effect*** determination has been made for the proposed Johnson Lane Interchange project activities for both the Whooping Crane and Red Knot. Additionally, the monarch butterfly is not anticipated in the project area due to limited habitat and timing of construction. Therefore, the Johnson Lane Interchange project would ***not jeopardize the continued existence*** of monarch butterfly.

- On September 22, 2015, USFWS determined that the protection for the Greater Sage-Grouse under the Endangered Species Act was no longer warranted and withdrew the species from the candidate species list. In Montana, the state has management authority over Sage Grouse as outlined under the 2015 Greater Sage-Grouse Stewardship Act and Montana Governor's Executive Orders 10-2014, 12-2015, and 21-2015. The Sage Grouse Habitat Conservation Program was created to facilitate implementation of the Executive Orders. State actions implemented by MDT in designated Greater Sage-Grouse habitat must comply with the conservation program.

  The Johnson Lane Interchange project segment is not within greater sage-grouse designated core habitat, connectivity habitat, or general habitat. The nearest designated sage grouse habitat, which is general habitat, is approximately 2.8 miles northwest of the proposed segment. The Johnson Lane Interchange project activities are consistent with the Montana Sage Grouse Conservation Strategy.

1.0 INTRODUCTION

Due to availability and type of funding, the Montana Department of Transportation (MDT) will implement Phase I of the Billings Bypass Project as six separate construction projects. The fourth potential project to be constructed as part of Phase I is the Johnson Lane Interchange project. This segment of the Billings Bypass is located within the community of Lockwood, Yellowstone County, Montana, and includes Johnson Lane from the Coulson Road Intersection to approximately 750 feet south of its intersection with Old Hardin Road; Old Hardin Road from the intersection of Rykken Circle to approximately 680 feet east of its intersection with Cole Street; Cole Street approximately 190 feet north of the Old Hardin Road Intersection to its intersection with Becraft Lane; the Becraft Lane/Cole Street Intersection; Interstate 90 (I-90) from approximately 3,660 feet west of the Johnson Lane/I-90 overpass to 3,695 feet east of the overpass, including the eastbound and westbound on and off ramps; the North Frontage Road from approximately 1,250 feet west of Town Pump to its intersection with Sannon Boulevard; and Sannon Boulevard from its intersection with North Frontage Road to its intersection with Coulson Road. The Johnson Lane Interchange project is located within Sections 19 and 30 of Township 1 North, Range 27 East (Figure 1).

This Biological Resources Report/Biological Assessment (BRR/BA) Addendum Report has been prepared as part of BRR/BA re-evaluation of the Johnson Lane Interchange segment of the Billings Bypass project. This report provides general biological resources updates, aquatic resources and wetlands updates, state Species of Concern updates, and updated information on federally threatened and endangered species within the Johnson Lane Interchange project vicinity since the August 2013 BRR/BA addendum and 2014 Billings Bypass Final Environmental Impact Statement (FEIS). The report also includes an updated assessment of potential impacts to these resources as a result of the proposed Johnson Lane Interchange project.

For the purposes of this document, “project limits” refers to the limits of potential construction; whereas, “project vicinity” refers to a 3.0-mile radius around the project limits in which specific biological resources are evaluated.

2.0 BRR/BA SECTION 1.1 – PROJECT DESCRIPTION UPDATES

As part of the 2014 Billings Bypass FEIS, five options were developed for the Johnson Lane/I-90 Interchange and associated secondary intersections at Old Hardin Road/Johnson Lane, Old Hardin Road/Becraft, and Johnson Lane/North Frontage Road. A preferred alternative for the Johnson Lane Interchange project segment, however, was never determined and outlined in the 2014 Billings Bypass FEIS and ROD. The FEIS and ROD instead stated that the precise configuration of the Johnson Lane Interchange and associated secondary intersections would be determined during final design. For the purpose of impact analysis in the 2014 FEIS and ROD, a maximum potential footprint for the Johnson Lane Interchange project, in which impacts may occur, was determined. The maximum footprint outlined in the FEIS included the Johnson Lane/I-90 Interchange and approximately 0.75 miles of I-90 (3,960 feet), the North Frontage Road, Sannon Boulevard, and Johnson Lane from the Coulson Road Intersection to approximately 440 feet south of its intersection with Old Hardin Road. At Old Hardin Road, the footprint only

extended 450 west of the Johnson Lane Intersection and ended at its intersection with Becraft Lane.

Since the August 2013 BRR/BA addendum and 2014 Billings Bypass FEIS and ROD, there have been several design refinements/changes to the Johnson Lane Interchange project segment. The associated design refinements/changes are described below. The overall proposed design for the Johnson Lane Interchange project segment is depicted in Figure 2, found in Appendix A.

Design Refinement/Change 1: Johnson Lane/I-90 Interchange and Johnson Lane. Five interchange options were developed for the Johnson Lane/I-90 Interchange and associated secondary intersections at Old Hardin Road/Johnson Lane, Old Hardin Road/Becraft, and Johnson Lane/North Frontage Road; however, a preferred alternative was never determined and outlined in the 2014 Billings Bypass FEIS and ROD. A diverging diamond interchange (identified in the 2014 FEIS and ROD as the double crossover diamond interchange) has been selected as the preferred alternative and carried forward to final design.

Under the diverging diamond interchange design, the two directions of traffic on Johnson Lane would cross to the opposite side on both sides of the I-90 overpass bridges. The general location of the I-90 westbound and eastbound ramps would be maintained; however, their approach alignments with Johnson Lane would be modified. The off-ramp and crossover sections would be signalized. Johnson Lane through the Johnson Lane/I-90 Interchange would vary between two or three through lanes to accommodate on and off ramps.

At the signalized Johnson Lane and Old Hardin Road Intersection, both Johnson Lane and Old Hardin Lane would be widened to accommodate additional through lanes and designated left- and right-turn lanes.

Design Refinement/Change 2: North Frontage Road. Under the diverging diamond option (double crossover diamond) outlined in the 2014 FEIS and ROD, the North Frontage Road would have essentially remained on its existing alignment, crossing Johnson Lane at its current location, with a new traffic signal proposed at the intersection.

Under the proposed Johnson Lane Interchange project segment, the configuration of the diverging diamond would now extend further to the north along Johnson Lane. In order to accommodate sufficient storage lengths for the proposed turn lanes at the new interchange, adequate spacing between the North Frontage Road Intersection and the proposed ramp terminals would be required. This meant shifting the North Frontage Road and Johnson Lane intersection approximately 450 feet to the north of the existing location. To connect to the new intersection, the North Frontage Road alignment west of Johnson Lane would curve north through the east end of the Town Pump parking lot. The alignment would then curve back east to the new intersection location.

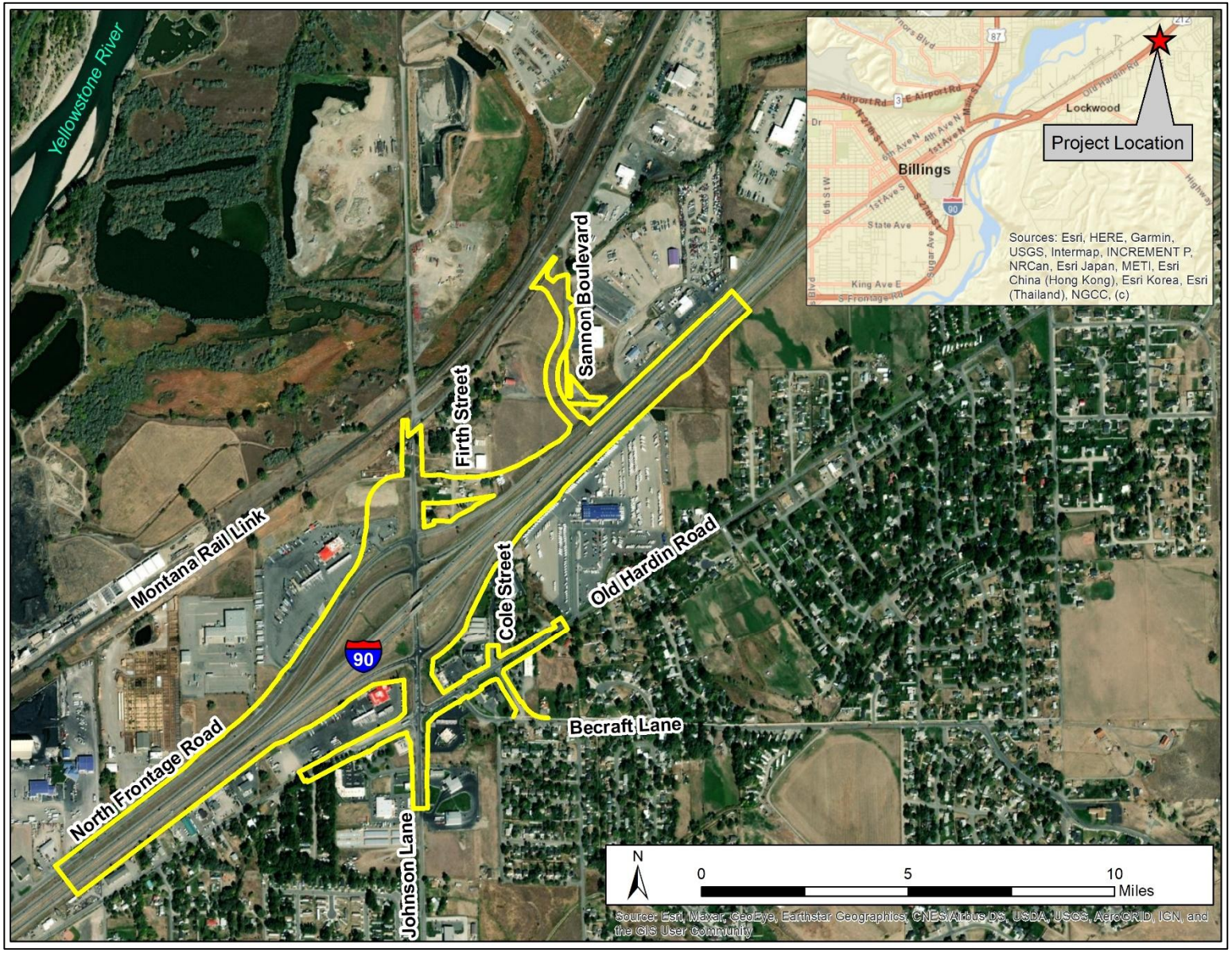

Figure 1. Project Limits and Vicinity

Because the Firth Street residential area is located on the east side of Johnson Lane, several connection/access alternatives for the North Frontage Road east of Johnson Lane were evaluated. The preferred alternative would realign the eastern segment of North Frontage Road through the residential area on Firth Street to connect the eastern segment at the new intersection with Johnson Lane and the North Frontage Road western segment. This alternative was chosen because it maintained the direct connection to North Frontage Road east of Johnson Lane, which businesses along that segment of roadway relied upon, particularly commercial truck traffic coming off I-90. The new North Frontage Road alignment would directly impact five residential structures and one commercial warehouse.

The new North Frontage Road and Johnson Lane intersection would be a signal-controlled intersection. Both Johnson Lane and the North Frontage Road would be widened at the intersection to accommodate designated left- and right-turn lanes.

Design Refinement/Change 3: Sannon Boulevard. Due to the steep grades along the existing Sannon Boulevard alignment, a new alignment and profile for the roadway, from the North Frontage Road to Coulson Road, is proposed. The new alignment and profile would include two, long s-curves to decrease the maximum grade (a decrease of 4.54%) and flatten the horizontal curves. The roadway profile would include two, 12-foot travel lanes and 2-foot shoulders. This new alignment and profile would provide an access improvement for vehicles, particularly for large trucks, that may use Sannon Boulevard as a connector between the North Frontage Road and Coulson Road. Approximately one-third of the Sannon Boulevard reconstruction would be obliterated and connected to the Billings Bypass when the Railroad Overpass to Johnson Lane segment is constructed.

Design Refinement/Change 4: Old Hardin Road and Becraft Lane Intersection. Under the diverging diamond option (double crossover diamond) outlined in the 2014 FEIS and ROD, a Y-shaped configuration was proposed at the Becraft intersection with Old Hardin Road. The lane configuration on Old Hardin Road included one eastbound through lane and one eastbound designated, free-flow, right-turn only lane onto Becraft Lane. Northbound traffic on Becraft Lane would be forced to use a designated right-turn only lane onto Old Hardin Road, as no left-turn option would be available. This intersection configuration also did not provide a left-turn option for westbound traffic on Old Hardin Road wanting to turn left on to Becraft Lane, due to the Y-shaped configuration. A traffic signal was not proposed at this intersection.

Under the proposed Johnson Lane Interchange project segment, the Y-shaped configuration at the Becraft intersection has been removed. The lane configuration at the Old Hardin Road and Becraft Intersection includes two eastbound through lanes, with the right through lane providing the ability to turn right onto Becraft Lane. A designated right-turn only lane for northbound traffic on Becraft Lane would remain, as a left-turn option onto Old Hardin Road is not available. However, a designated left-turn lane for westbound traffic on Old Hardin Road has been included, which would allow westbound traffic to turn left on to Becraft Lane. The intersection would remain unsignalized.

Design Refinement/Change 5: Old Hardin Road and Cole Street Intersection. Under the diverging diamond option (double crossover diamond) outlined in the 2014 FEIS and ROD, a signalized intersection was proposed at Old Hardin Road and Cole Street and Cole Street would be improved (i.e., widened) south of Old Hardin Road to provide a new connector street to Becraft Lane. Under the proposed Johnson Lane Interchange project segment, the intersection is still proposed as a signalized intersection and Cole Street south of Old Hardin Road would still be improved. The lane configuration at the intersection on Old Hardin Road, however, has been updated to include one eastbound through lane and one designated eastbound right-turn lane onto Cole Street, two westbound through lanes with the option to turn right onto Cole Street, and a designated left-turn lane at the intersection for both east and westbound traffic to turn left onto Cole Street.

Design Refinement/Change 6: Cole Street and Becraft Lane Intersection. The diverging diamond (double crossover diamond) outlined in the 2014 FEIS and ROD included improvements (i.e., widened) to Cole Street, south of Old Hardin Road, that ended in a skewed T-intersection connection at Becraft Lane. During design refinements for the proposed Johnson Lane Interchange project segment, several alternatives were considered for the Cole Street and Becraft Lane intersection.

The preferred alternative for the Cole Street and Becraft Lane intersection is a Y-shaped configuration where eastbound traffic on Becraft Lane is stop controlled and Cole Street is free-flow onto the east segment of Becraft Lane. Because of the Y-shape configuration, driveways to homes south of Becraft Lane would be extended to meet the new intersection alignment.

Design Refinement/Change 7: Updated Project Footprint. To accommodate the new design features now included in the Johnson Lane Interchange project, the footprint in which impacts may occur or area of potential effect (APE), was updated from what was shown in the 2014 FEIS and ROD. The APE along Johnson Lane now extends from the Coulson Road intersection to approximately 750 feet south of its intersection with Old Hardin Road. The APE along Old Hardin Road now extends from the intersection of Rykken Circle to approximately 680 feet east of its intersection with Cole Street. Cole Street, from approximately 190 feet north of the Old Hardin Road intersection to its intersection with Becraft Lane, and the Becraft Lane and Cole Street intersection are now included. The APE along I-90 is extended from approximately 3,660 feet west of the Johnson Lane/I-90 overpass to 3,695 feet east of the overpass, including the eastbound and westbound on and off ramps. The APE surrounding the North Frontage Road and Sannon Boulevard remains relatively the same. This updated footprint is the current footprint for documenting any changes to biological conditions.

3.0 BRR/BA Section 3.0 – General Vegetation and Wildlife

The Johnson Lane Interchange existing general vegetation and general wildlife conditions, avoidance and minimization measures, and recommended conservation measures described in the 2011 BRR/BA, subsequent 2012 and 2013 addenda, and the 2014 Billings Bypass FEIS are still valid and remain unchanged. The preferred design for

the Johnson Lane/1-90 Interchange, proposed intersection improvements, updates to the North Frontage Road realignment (an additional 7.5 acres of new right-of-way [ROW]), and improvements to Sannon Boulevard (an additional 2.8 acres of new ROW) are not anticipated to greatly increase impacts to general vegetation and general wildlife and will not be addressed further in this addendum report.

4.0 BRR/BA SECTION 4.0 – AQUATIC RESOURCES

4.1 WATERWAYS

Methods

In 2011, a wetland delineation was completed as part of the developing Billings Bypass EIS. As it has been more than 10 years since the original wetland delineation was conducted, and to ensure all wetlands and other waters were identified within the refined design footprint for the Johnson Lane Interchange project, a new wetland delineation was conducted in September 2020. Prior to the field visit, the Johnson Lane Interchange project limits were researched for the potential presence of aquatic resources. Various mapping resources were used, including the US Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps, US Geological Service (USGS) topographic quad maps, and aerial photographs. During the site visit, the project limits were investigated for waterways and other aquatic resources according to the US Army Corps of Engineers (USACE) Regulatory Guidance Letter No. 05-05: Ordinary High Water Mark Identification (USACE, 2005). Wetlands and waterways identified during the September 2020 field visit are shown in Appendix B.

Results

Two irrigation ditches were identified within the Johnson Lane project limits. Coulson Ditch was identified within the Sannon Boulevard portion of the project limits. In the 2011 delineation, this ditch was delineated entirely as wetland (Wetland S). During the 2020 delineation effort, the ditch was reviewed within the project limits for wetland indicators. Water was not flowing in the ditch, and the ditch appeared to have not conveyed flows for a very long time. The bed and bank of the ditch were vegetated with upland species, including showing milkweed (*Asclepias speciosa*), smooth brome (*Bromus inermis*), spreading dogbane (*Apocynum androsaemifolium*), and Russian olive (*Elaeagnus angustifolia*). This aquatic resource has been updated to a non-wetland irrigation ditch, with a Riverine, Unknown Perennial, Unconsolidated Bottom, which is Semi-permanently Flooded and Excavated (R5UBFx) classification. The width of the channel within the project limits is approximately 7 to 9 feet wide. Coulson Ditch eventually flows into the Yellowstone River.

One additional irrigation ditch, the Lockwood Ditch, was identified adjacent to the south side of Old Hardin Road. This ditch was not included as part of the 2011 delineation. The USFWS NWI database identifies this ditch as Riverine, Unknown Perennial, Unconsolidated Bottom, which is Semi-permanently Flooded and Excavated (R5UBFx). This aquatic resource is a man-made ditch that varies from 5 to 7 feet wide. Within the project limits, approximately 475 linear feet of the ditch is open/daylighted. The remaining 1,965 linear feet is conveyed through a buried pipe. The ditch primarily conveys irrigation

water and some stormwater. The irrigation water from the ditch eventually flows into Coulson Ditch.

Potential Impacts, Avoidance, Minimization, and Recommended Conservation Measures

Improvements under the Johnson Lane Interchange project include a 70 linear foot arched culvert within Coulson Ditch to accommodate the new Sannon Boulevard connection to Coulson Road. This would result in approximately 0.013 acres of permanent impact to Coulson Ditch. Improvements under the proposed project also include culvert extensions within the Lockwood Ditch and a segment of the Lockwood Ditch being piped (150 linear feet). This would result in approximately 0.018 acres of permanent impact to the Lockwood Ditch. Impacts to irrigation ditches, along with avoidance/minimization measures and recommended conservation measures, are described in the 2014 Billings Bypass FEIS, and still remain valid.

Coulson Ditch and Lockwood Ditch are anticipated to be USACE jurisdictional due to their potential downstream connection to the Yellowstone River, a known water of the US. The USACE reserves the final determination of jurisdictional status. Any placement of fill material within the ditch channels would require permitting under Section 404 of the Clean Water Act (CWA), should these ditches be determined as jurisdictional. The USACE is the regulatory agency with authority to permit the placement of fill or dredged materials into aquatic resources under their jurisdiction. A permit application would be submitted to the USACE.

MDT Standard Specifications for Road and Bridge Construction effectively address resources including water pollution controls as defined by state, local, and federal laws and regulations. These requirements limit vegetation disturbance within the staked boundaries of the project, thus minimizing effects on surrounding, more productive habitats, and reducing erosion during construction.

4.2 GENERAL AQUATIC SPECIES

The Montana Fish, Wildlife, and Parks' (FWP) FishMT database provides information on fish species distribution, supporting data for distribution, and information related to the management of aquatic species in Montana's waterways. The FishMT database does not provide information on irrigation ditches, which is the only type of waterway identified within the project limits. Given the lack of suitable habitat within the project limits, no aquatic species are likely to occur and no impacts to aquatic species under the proposed Johnson Lane Interchange project are anticipated.

5.0 BRR/BA SECTION 5 – SPECIES OF CONCERN and SPECIAL STATUS SPECIES

Methods

A data request was submitted to MTNHP to determine if there were any changes to state Species of Concern or Special Status Species in or near the Johnson Lane Interchange project vicinity since the 2011 BRR/BA, subsequent 2012 and 2013 addenda, and the

2014 Billings Bypass FEIS (MTNHP, 2021a). Additionally, Montana FWP Bald and Golden Eagle information was requested from MTNHP. Appendix C provides all information received from the formal MTNHP request.

Results

Documented occurrences of 13 wildlife state Species of Concern and one plant Species of Concern were recorded within 3.0 miles of the Johnson Lane Interchange project limits (Appendix C, MTNHP, 2021a). Eleven of these species have been addressed in the 2011 BRR/BA and 2014 FEIS. Information on these species is still valid and remains unchanged; therefore, no additional discussion on these 11 species is included in this addendum. The three additional recorded Species of Concern not addressed in the 2011 BRR/BA or the 2014 FEIS, their conservation status, habitat requirements, and potential to occur in the project limits are outlined below in Table 1.

Table 1. Updates to State Species of Concern within the Johnson Lane Interchange project vicinity

Species	Status*	Last Observed in Project Vicinity	Habitat Requirements	Potential to Occur in Project Limits
Mammals				
Long-eared Myotis (*Myotis evotis*)	S3, G5	2021	Occupy a wide range of rocky and forested habitats over a broad elevation gradient. Summer day roosts include abandoned buildings, bridges, hollow trees, stumps, under loose bark, and rock fissures. Hibernacula include caves and abandoned mines.	Low potential to occur within the project limits. The project limits have been heavily disturbed and include I-90, local roadways, and commercial and residential development. Very little suitable habitat exists.
Little Brown Myotis (*Myotis lucifugus*)	S3, G3	2021	Found in a variety of habitats across a large elevation gradient. Commonly forages over water. Summer day roosts include attics, barns, bridges, snags, loose bark, and bat houses. Known maternity roosts in Montana are primarily buildings. Hibernacula include caves and mines.	Low potential to occur within the project limits. The project limits have been heavily disturbed and include I-90, local roadways, and commercial and residential development. Very little suitable habitat exists.
Plants				
Bractless Hedge-hyssop *(Gratiola ebracteate)*	S2, G4	2018	Drying mud around ponds in the foothills and on the plains.	Unlikely to occur in project limits due to lack of suitable habitat.

Source: MTNHP, 2021a and Montana Field Guide (fieldguide.mt.gov)

*Key to rankings: G=Global rank based on range-wide status, S=State rank based on status in Montana, S1: At high risk because of extremely limited and/or rapidly declining population numbers, range and/or habitat, making it highly vulnerable to global extinction or extirpation in the state; S2: At risk because of very limited and/or potentially declining population numbers, range and/or habitat,

making it vulnerable to global extinction or extirpation in the state; S3: Potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas; S4: Apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining; G4: Uncommon but not rare (although it may be in parts of its range), and usually widespread; G5: Common, widespread, and abundant (although it may be rare in parts of its range). Not vulnerable in most of its range.

Bald and Golden Eagles are dually protected under the Bald and Golden Eagle Protection Act of 1940 and the Migratory Bird Treaty Act. 2020 Montana FWP observation data on Bald Eagles shows documented occurrences of Bald Eagle and Bald Eagle nests along the Yellowstone River corridor; however, no Bald Eagle nests or occurrences have been documented within 0.5 miles of the Johnson Lane Interchange project limits. MTNHP data shows the closest documented nesting Bald Eagle was over 0.5-miles northwest of the Johnson Lane Interchange northern limits. The nest was last documented in 2006. Additionally, MTNHP eagle data shows no documented occurrences of Golden Eagles or nests within 3.0 miles of the project footprint. During the September 2020 field visit of the Johnson Lane interchange project limits, no Bald or Golden Eagles or their nests were observed within or adjacent to the project limits.

A review of the Montana Sage Grouse Habitat Conservation Map (2021) shows the Johnson Lane Interchange project limits are not within core, general, or connectivity habitat for Greater Sage-Grouse. The nearest designated Sage Grouse habitat, which is general habitat, is approximately 2.8 miles northwest of the Johnson Lane Interchange project segment.

Potential Impacts, Avoidance, Minimization, and Recommended Conservation Measures

Impacts to 11 state Species of Concern, along with avoidance/minimization measures and recommended conservation measures, are described in the 2011 BRR/BA, subsequent 2012 and 2013 addenda, and the 2014 Billings Bypass FEIS, and still remain valid and unchanged.

Of the three additional Species of Concern, limited suitable habitat is found within the Johnson Lane Interchange project limits. This habitat is likely more conducive for foraging. More suitable habitat for Species of Concern is found north of the project limits along the Yellowstone River.

Construction activities may affect foraging individuals in the area through noise, vibration, human activity, and construction equipment. These impacts would be temporary and cease once construction is complete. Overall, impacts to state Species of Concern that may be present within the project limits are likely to be negligible and will not result in a declining trend in the population or the species as a whole.

Permanent impacts to mature trees and shrubs may affect avian habitat. In order to maintain compliance with USFWS and Migratory Bird Treaty Act guidance, disruption to nesting birds and disturbance of active nests will be avoided. Measures would be implemented to avoid the taking of migratory birds, their eggs, hatchlings, or fledglings during construction. This will include removing any suitable nesting habitats (i.e., trees and shrubs) existing within the construction limits, and that would be affected by

construction, outside of the nesting season (August 16 to April 15). If an active nest, including before or after the local nesting window, is discovered, the nest will be left in place and protected until the young hatch and depart.

MTNHP 2020 observation data on Bald Eagles shows several documented occurrences of Bald Eagle and Bald Eagle nests along the Yellowstone River Corridor; however, no Bald Eagle nests or occurrences have been documented within 0.5 miles of the project limits. Additionally, MTNHP eagle data shows no documented occurrences of Golden Eagles or nests within 3.0 miles of the project footprint. Therefore, additional minimization measures and timing restrictions for the Johnson Lane Interchange segment are currently not proposed. Should a new active nest be constructed and identified within 0.5 miles of the project limits, the MDT District Biologist would be contacted to coordinate with Montana FWP to determine if a timing restriction on construction activities is warranted.

6.0 BRR/BA SECTION 6 – THREATENED AND ENDANGERED SPECIES - BIOLOGICAL ASSESSMENT

Methods

The October 2021 USFWS Endangered, Threatened, Proposed, and Candidate Species list for Yellowstone County and the USFWS Information for Planning and Consultation (IPaC) database for the project vicinity were reviewed to determine if there were any changes in federally listed species in or near the Johnson Lane Interchange project vicinity since the 2011 BRR/BA, subsequent 2012 and 2013 addenda, and the 2014 Billings Bypass FEIS (USFWS, 2021a and 2021b). The MTNHP database for threatened or endangered species was also reviewed for occurrences within and adjacent to the project limits (MTNHP, 2021a).

Results

Since the 2011 BRR/BA, subsequent addenda, and the 2014 FEIS, the Greater Sage-Grouse (*Centrocercus urophasianus*), black-footed ferret (*Mustela nigripes*), and Sprague's Pipit (*Anthus spragueii*) have been removed from the list of endangered, threatened, proposed, and candidate species for Yellowstone County. The USFWS determined that the protection for the Greater Sage-Grouse under the Endangered Species Act was no longer warranted and withdrew the species from the candidate species list in September 2015. In April 2016, the USFWS determined that listing the Sprague's Pipit as an endangered or threatened species was not warranted throughout all or a significant portion of its range and removed the species from candidate status.

Currently, the USFWS shows two federally listed species and one candidate species with the potential to occur in Yellowstone County, Montana (Appendix D). These include Whooping Crane (*Grus Americana*), Red Knot (*Calidris canutus*), and monarch butterfly (*Danaus plexippus*). The IPaC database for the project vicinity only lists two of these species, Red Knot and monarch butterfly, as potentially occurring in the Johnson Lane Interchange project vicinity. Whooping Crane was addressed in the 2011 BRR/BA, subsequent addenda, and 2014 FEIS. Red Knot and monarch butterfly were not assessed in the 2011 BRR/BA, subsequent addenda, and 2014 FEIS, because Red Knot was not listed until January 12, 2015, and monarch butterfly was designated as a

candidate species on December 15, 2020. The following information is provided in this BRR/BA Addendum Report to supplement the effects analysis.

Red Knot

Species Description

Red Knot is a medium-sized sandpiper that is about 9 to 10 inches (23 to 25 centimeters [cm]) in length (Baker et al., 2013). Red Knot has a distinctive breeding plumage that is salmon-red to brick-red color. It has a light-colored lower belly and under tail region. The back and tail feathers are generally dark gray with light edges and subterminal rust-colored spots (Baker et al., 2013).

Red Knots annually migrate between arctic tundra breeding grounds and marine wintering habitats as far south as Tierra del Fuego, an annual migration distance of up to 30,000 km (Baker et al., 2013), using stopover sites in the Northern Great Plains of the United States and Canada.

Migratory stopovers in Montana are rare but are most common at larger wetlands. The majority (60 percent) of the documented migratory stopovers in Montana have been at Freezeout Lake, Benton Lake National Wildlife Refuge, and Lake Bowdoin National Wildlife Refuge (FWP, 2021).

Reason for Decline and Federal Status

Red Knot was listed as Threatened on January 12, 2015, due to loss of breeding and nonbreeding habitat, disruption of natural predator cycles on breeding grounds, reduced prey availability throughout the nonbreeding range, and increasing frequency and severity of mismatches in the timing of the birds' annual migratory cycle relative to favorable food and weather conditions (Federal Register 79(238):73706-73748).

Occurrence in Project Limits

The last known observation of a Red Knot in the vicinity of the Johnson Lane Interchange project limits was in 1975. The observation was of a transient individual.

Monarch Butterfly

Species Description

Adult monarch butterflies are large butterflies with orange wings with black borders and black veins, as well as white speckling. Larvae emerge from their eggs on obligate milkweed host plants after two to five days. The larvae transition through five larval instars over the course of 9 to 18 days. Lastly, they pupate into a chrysalis before emerging 6 to 14 days later as an adult Monarch Butterfly (USFWS, 2021c).

Monarchs prefer open places, native prairie, foothills, open valley bottoms, roadsides, open weedy fields, pastures, and marshes. During migration, monarchs need nighttime roosting sites. In the western population, roosting generally occurs in both native and nonnative deciduous and evergreen trees. Monarchs have been observed using narrow-leaved tree species such as willows, Russian olives, locusts, pines, and eucalyptus as roosting sites (USFWS, 2021d). Monarch butterflies living east of the Rocky Mountains

migrate from Canada to central Mexico where they overwinter. Monarchs typically do not arrive in Montana until June or July and migrate south between September and October (FWP, 2021).

Reason for Decline and Federal Status

The monarch butterfly was designated as a Candidate Species on December 15, 2020, due to long-term declines in overwintering populations, largely due to loss and degradation of habitat, exposure to insecticides, and climate change (Federal Register 85(243):81813-81822).

Occurrence in Project Limits

Monarch butterflies migrate through Montana in the spring and fall as they move between central Mexico and Canada. While monarch butterflies may migrate through the area, suitable foraging and resting habitat is limited within the Johnson Lane Interchange project footprint, as most of the area has been heavily disturbed and developed. According to MTNHP, the closest recorded observation of a monarch butterfly was over 30 miles southwest of the project limits in 2016.

Potential Impacts, Avoidance, Minimization, and Recommended Conservation Measures

There are no records of Red Knot or Whooping Crane breeding in the state, although they are known to migrate through Montana on occasion in the spring and fall as they head to breeding territories in northern Canada and the Arctic, respectively. There are three observations for Whooping Crane within a 30-mile radius of the proposed Johnson Lane Interchange project over the last 100 years. The nearest observation was documented more than 10 miles to the northeast as a fly-over in April 2010.

One observation of Red Knot is documented less than 1.0 mile from the proposed Johnson Lane Interchange project limits. This individual was a transient (non-breeding and short-term) documented in 1975, and not seen since. Neither of these species would be anticipated in the project vicinity as limited-to-no-appropriate habitat is present and neither species is documented as spending any considerable time in the state. The documented observations of these species are individuals flying over the general area, or, as in the case of the Red Knot, an unanticipated short-term stopover. Therefore, a ***No Effect*** determination has been made for the proposed Billings Bypass Johnson Lane Interchange project activities for both the Whooping Crane and Red Knot.

Additionally, the monarch butterfly is not anticipated in the project area due to limited habitat and timing of construction. During migration, monarchs do not typically arrive in Montana until June or July. The Johnson Lane Interchange project would likely start, and vegetation removed, prior to that arrival. Therefore, the Johnson Lane Interchange project would ***not jeopardize the continued existence*** of monarch butterfly.

7.0 WETLANDS

Methods

In 2011, a wetland delineation was completed as part of the developing Billings Bypass EIS. As more than 10 years have passed since the original wetland delineation was conducted, and to ensure all wetlands and other waters were identified within the refined design footprint for the Johnson Lane Interchange project, a new wetland delineation was conducted in September 2020. Prior to the field visit, the Johnson Lane Interchange project limits were researched for the potential presence of wetlands. Various mapping resources were used, including USFWS NWI maps, USGS topographic quad maps, aerial photographs, and Natural Resource Conservation Service soils maps. The 2011 Billings Bypass wetland delineation information was also reviewed.

During the site visit, wetland delineations were conducted following the Routine Method described in the USACE wetland delineation manual (USACE, 1987), and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0) (USACE, 2010). A Wetland Determination Data Form – Great Plains Region was completed for paired locations throughout the project limits to document wetland and upland conditions, and wetland habitats were assessed for 12 function and value variables in accordance with the MDT Montana Wetland Assessment Method (MDT 2008) (Appendix E). Because the area has been heavily developed, the Johnson Lane Interchange proposed ROW and easements were used as the survey limits to capture all wetlands that could be potentially impacted by the project. Wetlands and other non-wetland aquatic resources identified during the September 2020 field visit are shown in Appendix B.

Results

The 2011 wetland delineation effort identified two wetlands within the Johnson Lane Interchange project limits, Wetland T and Wetland S. Wetland T was made up of three, connected, small wetlands located within a drainage that conveys irrigation runoff and stormwater through the Johnson Lane/I-90 Interchange and into Coulson Ditch. Wetland S was an emergent wetland associated with Coulson Ditch. During the September 2020 wetland delineation, the 2011 wetland boundaries for Wetland T, within the survey limits were updated to current conditions. This included paired data plots at each small wetland and re-delineating the wetland boundaries with a map-grade GPS unit. To meet current naming conventions, Wetland T was relabeled as Wetland JI-WL2a-c. Coulson Ditch and Wetland S, within the project limits, was also reviewed for wetland indicators. Water was not flowing in the ditch, and the ditch appeared to have not conveyed flows for a very long time. The bed and bank of the ditch were vegetated with upland species, including showing milkweed, smooth brome, spreading dogbane, and Russian olive. This aquatic resource has been updated to a non-wetland irrigation ditch, with a Riverine classification.

One additional wetland was identified and delineated within the Johnson Lane Interchange project limits during the 2020 delineation effort. This wetland (JI-WL1a-b) is an emergent fringe wetland along Lockwood Ditch. Table 2 provides the 2020 updated information for all wetlands identified within the survey limits.

Table 2. 2020 Johnson Lane Interchange Segment Delineated Wetlands

Wetland		2020 Acreage	Wetland Cowardin Classification	MDT Functional Rating	Likely Jurisdictional	Wetland Description/ Jurisdictional Justification
JI-WL1 (WL not previously identified)	WL1a	0.024	PEM	IV	Yes	Wetland fringe along Lockwood Ditch, which eventually flows into Coulson Ditch, which flows into the Yellowstone River.
	WL1b	0.022				
JI-WL2 (Formerly labeled WL T)	WL2a	0.129	PEM	IV	Yes	A group of small, connected wetlands found within a drainage that that conveys irrigation runoff and stormwater through the Johnson Lane/I-90 Interchange and into Colson Ditch, which flows into the Yellowstone River.
	WL2b	0.206				
	WL2c	0.024				
WL S (No longer WL)		0.00	R5UBFx	–	Yes	No wetland indicators were identified in 2020. This aquatic resource has been updated to a non-wetland irrigation ditch, with a Riverine classification (Refer to Coulson Ditch in Section 4.1)
Total		**0.405**				

Potential Impacts, Avoidance, Minimization, and Recommended Conservation Measures

Under the scope of work for the Johnson Lane Interchange segment outlined in the 2011 BRR/BA, subsequent addenda, and 2014 FEIS, approximately 0.37 acres of wetland impact was determined. Permanent wetland impact because of the refinement/changes to the Johnson Lane Interchange project design and updated wetland delineation is approximately 0.38 acres. As outlined in the 2014 FEIS, approximately 0.37 acre of permanent wetland impact was determined for the Johnson Lane Interchange segment, with all impacts occurring at Wetland JI-WL2. Permanent wetland impact as a result of the refinement/changes to the Johnson Lane Interchange project design and updated wetland delineation is approximately 0.38 acre. Total wetland impacts only increased slightly (from 0.37 to 0.38 acre) due to the change in acreage delineated for Wetland JI-WL2 from 2011 to 2020 (0.37 acre in 2011 to 0.36 acre in 2020). The additional 0.02 acre of impacts are to the fringe wetland (JI-WL1) identified during the 2020 field delineation.

Impacted wetlands considered jurisdictional by the USACE would require permitting under Section 404 of the CWA. A permit application would be submitted to the USACE when final construction limits are finalized through design. The USACE has the authority to determine appropriate mitigation for jurisdictional wetlands that are impacted by fill placement or ground disturbance. Off-site wetland mitigation is recommended to accommodate the mitigation acreage that may be required to offset wetland impact acreage. Consultation with the USACE will be necessary to determine acceptable mitigation sites. Unavoidable wetland impacts may be mitigated at an established MDT Wetland Reserve or through an established in-lieu fee program. Final mitigation requirements to satisfy unavoidable impacts to wetlands require USACE approval prior to project construction and would occur during the project permitting phase. In addition, mitigation for wetland impacts would be required for federally funded highway projects under 23 CFR Part 777.

8.0 REFERENCES

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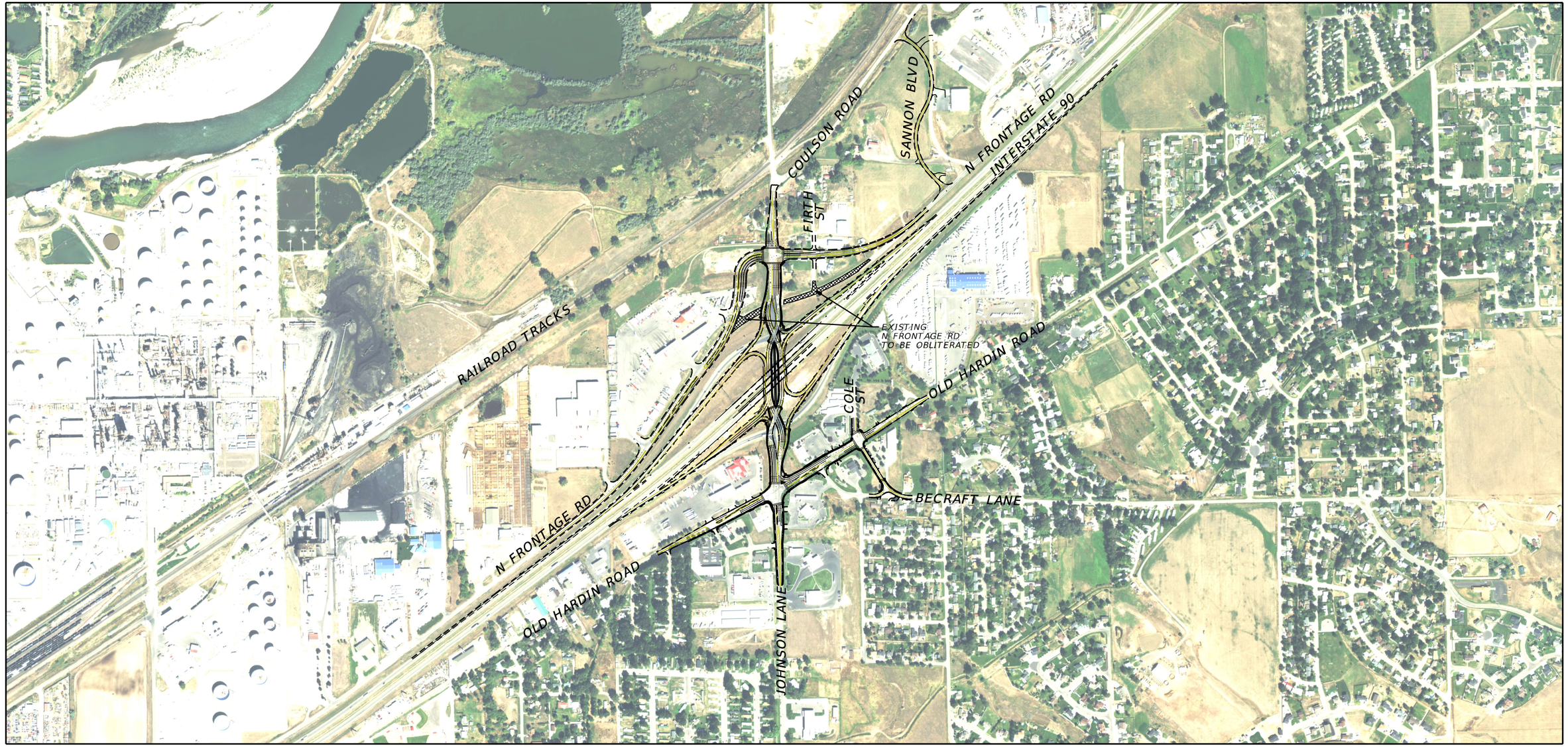
APPENDIX A

PROPOSED JOHNSON INTERCHANGE DESIGN FIGURE



PRELIMINARY

DOWL

FIGURE 2

PROJECT OVERVIEW

BILLINGS BYPASS - JOHNSON LANE INTERCHANGE

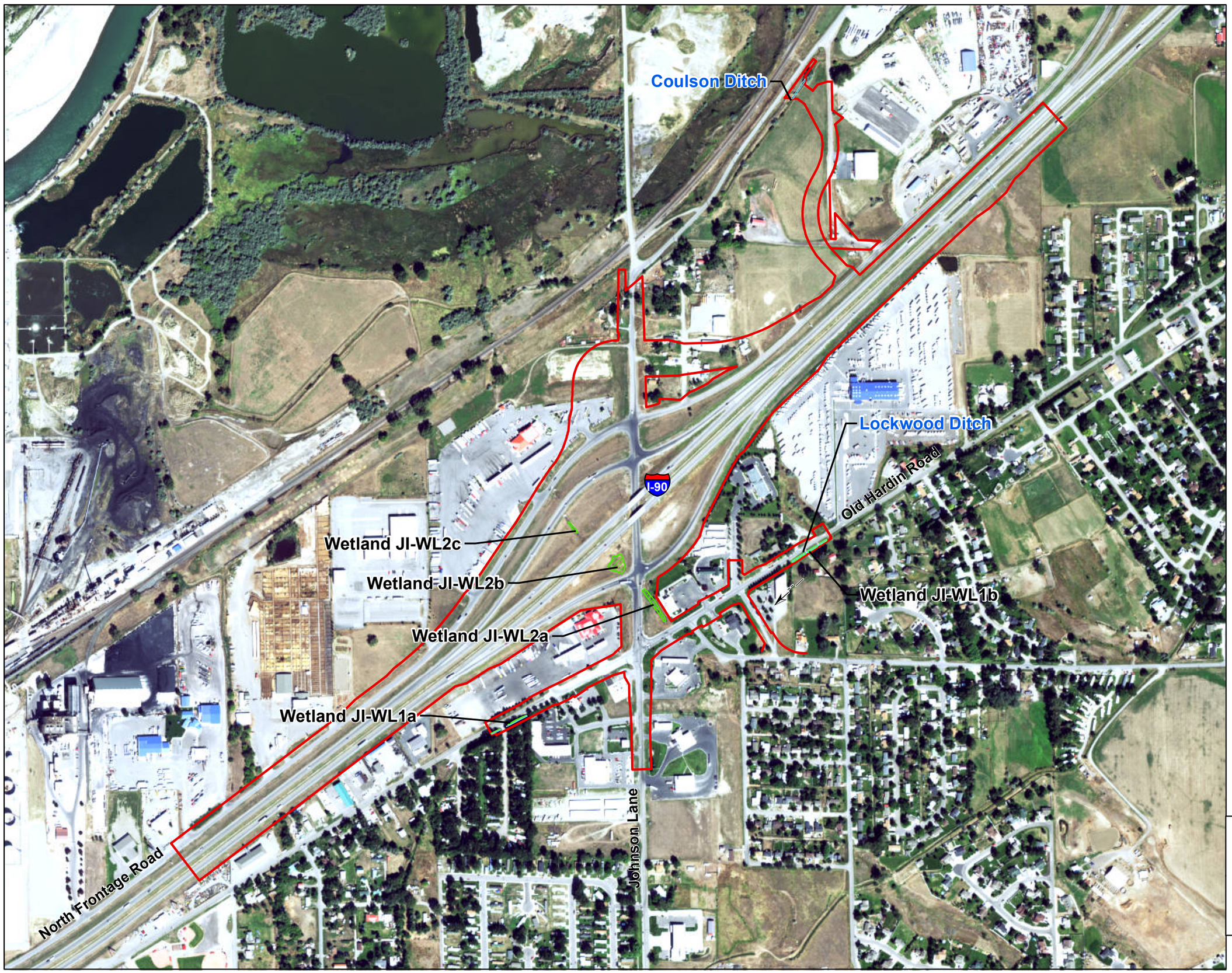
IM-CMBL-STPU-NCPD-NHPB 56(53), UPN 4199007

SCALE: 1"=800'

N

APPENDIX B

2020 JOHNSON LANE INTERCHANGE WETLAND DELINEATION FIGURES



Legend

- Delineated OHWM
- Delineated Wetland
- Project Footprint
- Flow Arrow

N
W E
S

0 250 500 1,000
Feet

Billings Bypass
Johnson Lane Interchange
Wetland and Other Aquatic Resources Delineation

Sheet 1

Legend

- Data Plot
- Delineated OHWM
- Delineated Wetland
- Project Footprint
- Flow Arrow

N
W E
S

0 100 200 400
Feet

Billings Bypass
Johnson Lane Interchange
Wetland and Other Aquatic Resources Delineation

Sheet 1a

Legend

- Data Plot
- Delineated OHWM
- Delineated Wetland
- Project Footprint
- Flow Arrow

N
W E
S

0 100 200 400 Feet

Billings Bypass
Johnson Lane Interchange
Wetland and Other Aquatic Resources Delineation

Sheet 1b

Lockwood Ditch

UP1b-SP

WL1b-SP

Wetland JI-WL1b

Old Hardin Road

Becraft Lane

Legend

- Data Plot
- Delineated OHWM
- Delineated Wetland
- Project Footprint
- Flow Arrow

N

W E

S

0 100 200 400 Feet

Billings Bypass
Johnson Lane Interchange
Wetland and Other Aquatic Resources Delineation

Sheet 1c

Legend

- Data Plot
- Delineated OHWM
- Delineated Wetland
- Project Footprint
- Flow Arrow

N
W E
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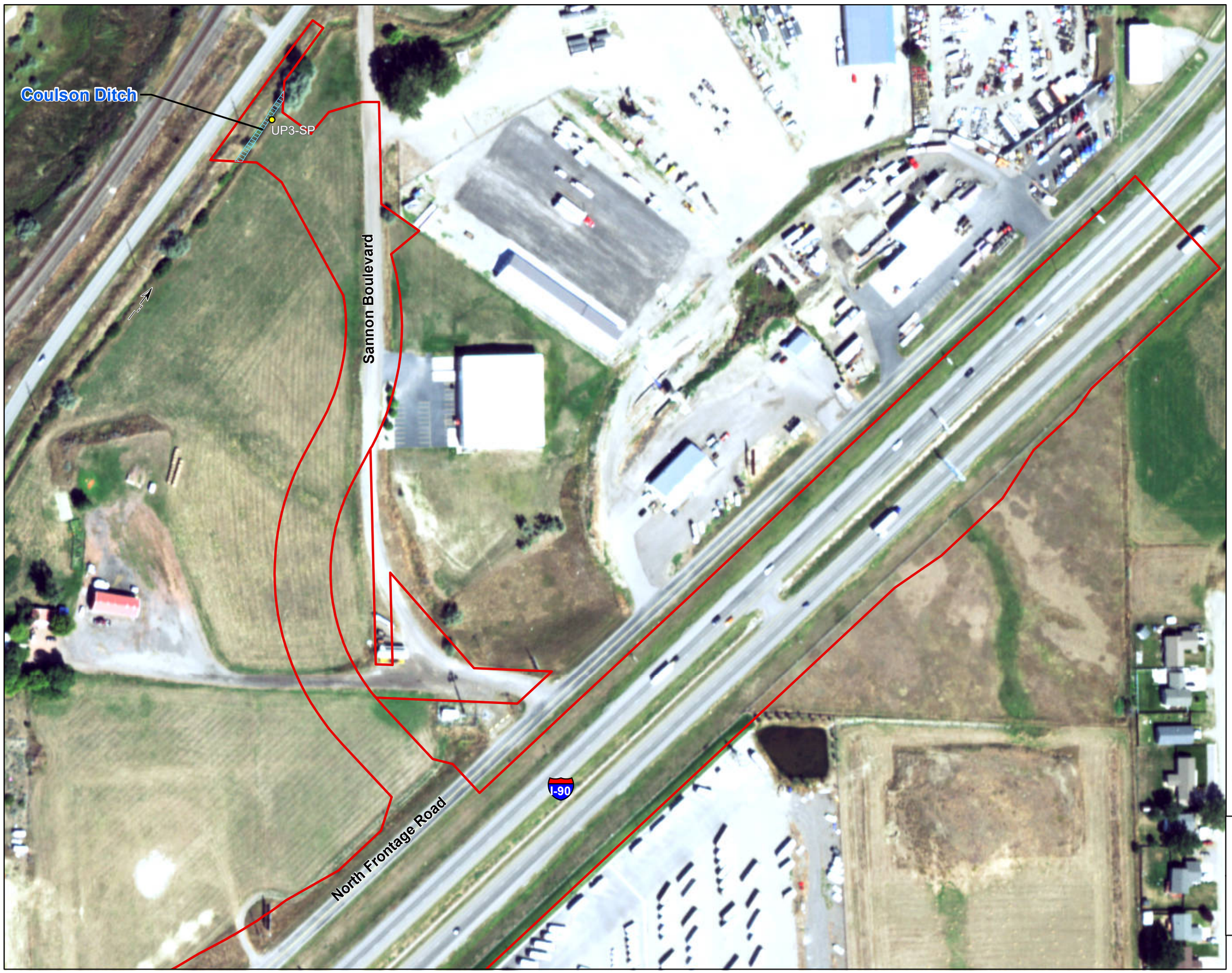
0 100 200 400 Feet

Billings Bypass
Johnson Lane Interchange
Wetland and Other Aquatic Resources Delineation

Sheet 1d



Legend

- Data Plot
- Delineated OHWM
- Delineated Wetland
- Project Footprint
- Flow Arrow

N
W E
S

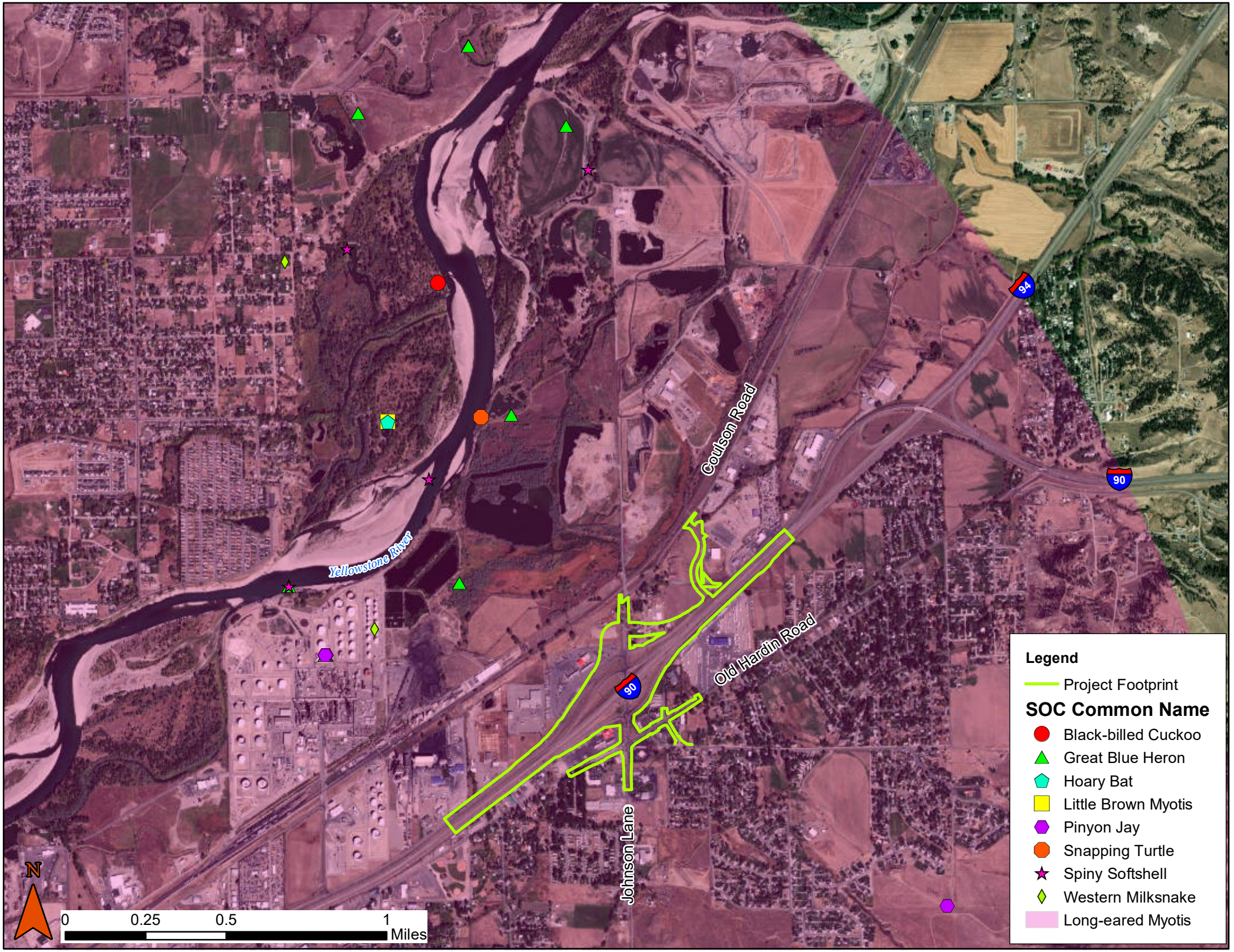
0 100 200 400 Feet

Billings Bypass
Johnson Lane Interchange
Wetland and Other Aquatic Resources Delineation

Sheet 1e

APPENDIX C

MONTANA SPECIES OF CONCERN IN PROJECT VICINITY


Coulson Road
Old Hardin Road
Johnson Lane
Yellowstone River
94
90
90
Legend
Project Footprint
SOC Common Name
Black-billed Cuckoo
Great Blue Heron
Hoary Bat
Little Brown Myotis
Pinyon Jay
Snapping Turtle
Spiny Softshell
Western Milksnake
Long-eared Myotis
N
0
0.25
0.5
1
Miles

APPENDIX D

US FISH AND WILDLIFE SPECIES LIST FOR YELLOWSTONE COUNTY, MONTANA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Montana Ecological Services Field Office
585 Shephard Way, Suite 1
Helena, MT 59601-6287
Phone: (406) 449-5225 Fax: (406) 449-5339

In Reply Refer To:
Consultation Code: 06E11000-2022-SLI-0068
Event Code: 06E11000-2022-E-00163
Project Name: 4024.20946.01

November 08, 2021

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

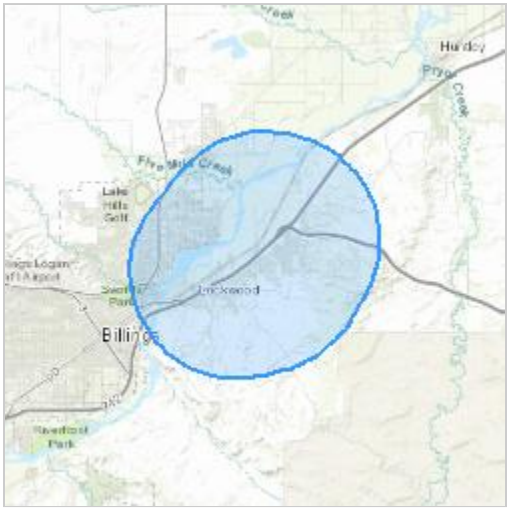
This species list is provided by:

Montana Ecological Services Field Office
585 Shephard Way, Suite 1
Helena, MT 59601-6287
(406) 449-5225

Project Summary

Consultation Code: 06E11000-2022-SLI-0068
Event Code: Some(06E11000-2022-E-00163)
Project Name: 4024.20946.01
Project Type: ** OTHER **
Project Description: NCDP 56(55)
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@45.8156483,-108.41435762209406,14z



Counties: Yellowstone County, Montana

Endangered Species Act Species

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Whooping Crane *Grus americana* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/758	Endangered

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

APPENDIX E

WETLAND DETERMINATION FORMS AND MONTANA WETLAND ASSESSMENT FORMS

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Billings Bypass - Johnson Lane Interchange City/County: Lockwood / Yellowstone Sampling Date: 9/23/2020

Applicant/Owner: Montana Department of Transportation State: MT Sampling Point: WL1a-SP

Investigator(s): Peterson - DOWL Section, Township, Range: Section 30, T1N, R27E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): LRR G Lat: 45.811382 Long: -108.416899 Datum: NAD 83

Soil Map Unit Name: Thurlow clay loam, 0 to 1 percent slopes (Ta) NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:
Wetland data plot for Wetland JI-WL1a, a emergent fringe wetland along Lockwood Ditch

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Phalaris arundinacea	90	Yes	FACW
2. Bromus inermis	10	No	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species 90	x 2 = 180
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species 10	x 5 = 50
Column Totals: 100 (A)	230 (B)

Prevalence Index = B/A = 2.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:
Small fringe of hydrophytic vegetation along irrigation ditch.

SOIL

Sampling Point: WL1a-SP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					silt clay	
6-16	2.5Y 5/2	97	10YR 4/6	3	C	M	silt clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

Depleted Matrix at 6 inches below surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils were moist. Plot taken in the fall when irrigation flows had been turned off. Hydrology likely present in spring and summer. Site still met secondary indicators.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Billings Bypass - Johnson Lane Interchange City/County: Lockwood / Yellowstone Sampling Date: 9/23/2020

Applicant/Owner: Montana Department of Transportation State: MT Sampling Point: UP1a-SP

Investigator(s): Peterson - DOWL Section, Township, Range: Section 30, T1N, R27E

Landform (hillslope, terrace, etc.): Top of slope Local relief (concave, convex, none): convex Slope (%): 3

Subregion (LRR): LRR G Lat: 45.811397 Long: -108.416908 Datum: NAD 83

Soil Map Unit Name: Thurlow clay loam, 0 to 1 percent slopes (Ta) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:
Upland plot to WL1a-SP and Wetland JI-WL1a.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Bromus inermis	95	Yes	UPL
2. Medicago sativa	5	No	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species 100	x 5 = 500
Column Totals: 100 (A)	230 (B)

Prevalence Index = B/A = 5.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:
All upland vegetation along top of bank.

SOIL

Sampling Point: UP1a-SP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					silt clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

Matrix color was consistent down to 16 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Plot taken at top of irrigation ditch bank. No hydrology indicators were present.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Billings Bypass - Johnson Lane Interchange City/County: Lockwood / Yellowstone Sampling Date: 9/23/2020

Applicant/Owner: Montana Department of Transportation State: MT Sampling Point: WL1b-SP

Investigator(s): Peterson - DOWL Section, Township, Range: Section 19, T1N, R27E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): LRR G Lat: 45.814301 Long: -108.409526 Datum: NAD 83

Soil Map Unit Name: Thurlow clay loam, 0 to 1 percent slopes (Ta) NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:
Wetland data plot for Wetland JI-WL1b, a emergent fringe wetland along Lockwood Ditch

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Phalaris arundinacea	60	Yes	FACW
2. Carex utriculata	45	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	105 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	45	x 1 =	45
FACW species	60	x 2 =	120
FAC species	_____	x 3 =	_____
FACU species	_____	x 4 =	_____
UPL species	_____	x 5 =	_____
Column Totals:	105 (A)		165 (B)

Prevalence Index = B/A = 1.57

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:
Small fringe of hydrophytic vegetation along irrigation ditch.

SOIL

Sampling Point: WL1b-SP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					silt clay	
3-14	2.5Y 5/2	95	10YR 4/6	5	C	M	silt clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

Depleted Matrix at 3 inches below surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils were moist. Plot taken in the fall when irrigation flows had been turned off. Hydrology likely present in spring and summer. Site still met secondary indicators. Cracked soils in ditch channel adjacent to wetland plot.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Billings Bypass - Johnson Lane Interchange City/County: Lockwood / Yellowstone Sampling Date: 9/23/2020

Applicant/Owner: Montana Department of Transportation State: MT Sampling Point: UP1b-SP

Investigator(s): Peterson - DOWL Section, Township, Range: Section 19, T1N, R27E

Landform (hillslope, terrace, etc.): Top of slope Local relief (concave, convex, none): convex Slope (%): 3

Subregion (LRR): LRR G Lat: 45.814317 Long: -108.409553 Datum: NAD 83

Soil Map Unit Name: Thurlow clay loam, 0 to 1 percent slopes (Ta) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:
Upland plot to WL1b-SP and Wetland JI-WL1b.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Bromus inermis	90	Yes	UPL
2. Medicago sativa	15	No	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	105 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species 105	x 5 = 525
Column Totals: 105 (A)	525 (B)

Prevalence Index = B/A = 5.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:
All upland vegetation along top of bank.

SOIL

Sampling Point: UP1b-SP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					silt clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

Matrix color was consistent down to 16 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Plot taken at top of irrigation ditch bank. No hydrology indicators were present.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Billings Bypass - Johnson Lane Interchange City/County: Lockwood / Yellowstone Sampling Date: 9/23/2020

Applicant/Owner: Montana Department of Transportation State: MT Sampling Point: WL2a-SP

Investigator(s): Peterson - DOWL Section, Township, Range: Section 19, T1N, R27E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR G Lat: 45.813100 Long: -108.413329 Datum: NAD 83

Soil Map Unit Name: Thurlow clay loam, 4 to 7 percent slopes (Tc) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:
Wetland data plot for Wetland JI-WL2a, a depressional emergent wetland within an unnamed drainage.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Phalaris arundinacea	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species 100	x 2 = 200
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: 100 (A)	200 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:
Depressional area of hydrophytic vegetation made up entirely of reed canary grass.

SOIL

Sampling Point: WL2a-SP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100					clay loam	
5-16	2.5Y 5/2	90	10YR 4/6	10	C	M	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

Depleted Matrix at 5 inches below surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils were moist. Plot taken in the fall. Hydrology likely present in spring and summer. Site still met secondary indicators.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Billings Bypass - Johnson Lane Interchange City/County: Lockwood / Yellowstone Sampling Date: 9/23/2020

Applicant/Owner: Montana Department of Transportation State: MT Sampling Point: UP2a-SP

Investigator(s): Peterson - DOWL Section, Township, Range: Section 19, T1N, R27E

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 8

Subregion (LRR): LRR G Lat: 45.813125 Long: -108.413262 Datum: NAD 83

Soil Map Unit Name: Thurlow clay loam, 4 to 7 percent slopes (Tc) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:
Upland plot to WL2a-SP and Wetland JI-WL2a.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Bromus inermis	90	Yes	UPL
2. Phalaris arundinacea	10	No	FACW
3. Cirsium arvense	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	105 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x 1 =	_____
FACW species	10	x 2 =	20
FAC species	_____	x 3 =	_____
FACU species	5	x 4 =	20
UPL species	90	x 5 =	450
Column Totals:	105 (A)		490 (B)

Prevalence Index = B/A = 4.66

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:
Dominant upland vegetation along hillslope.

SOIL

Sampling Point: UP2a-SP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100					clay loam	
12-16	10YR 4/2	100					sandy clay loam	layer with more sandy soils

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

Matrix color was consistent down to 12 inches then changed to more of a sandy soil. Did not meet depleted matrix indicator.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No indicators present. Plot was very dry.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Billings Bypass - Johnson Lane Interchange City/County: Lockwood / Yellowstone Sampling Date: 9/23/2020

Applicant/Owner: Montana Department of Transportation State: MT Sampling Point: WL2b-SP

Investigator(s): Peterson - DOWL Section, Township, Range: Section 19, T1N, R27E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR G Lat: 45.813955 Long: -108.414523 Datum: NAD 83

Soil Map Unit Name: Thurlow clay loam, 4 to 7 percent slopes (Tc) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:
Wetland data plot for Wetland JI-WL2b, a depressional emergent wetland within an unnamed drainage.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Phalaris arundinacea	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species 100	x 2 = 200
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: 100 (A)	200 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:
Depressional area of hydrophytic vegetation made up entirely of reed canary grass.

SOIL

Sampling Point: WL2b-SP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					silty clay	
4-16	10YR 2/1	30					silty clay	
	10YR 5/2	65	10YR 5/6	5	C	M	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

Depleted Matrix at 4 inches below surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- X Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils were moist. Plot taken in the fall. Hydrology likely present in spring and summer. Site still met secondary indicators. Area was very hummocky and looked like standing water had ponded in area at some point for a long duration.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Billings Bypass - Johnson Lane Interchange City/County: Lockwood / Yellowstone Sampling Date: 9/23/2020

Applicant/Owner: Montana Department of Transportation State: MT Sampling Point: UP2b-SP

Investigator(s): Peterson - DOWL Section, Township, Range: Section 19, T1N, R27E

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 5

Subregion (LRR): LRR G Lat: 45.813887 Long: -108.414499 Datum: NAD 83

Soil Map Unit Name: Thurlow clay loam, 4 to 7 percent slopes (Tc) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks:
Upland plot to WL2b-SP and Wetland JI-WL2b.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Bromus inermis	70	Yes	UPL
2. Poa pratensis	20	No	FACU
3. Agropyron cristatum	10	No	XX
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species 20	x 4 =	80
UPL species 70	x 5 =	350
Column Totals: 90 (A)		430 (B)

Prevalence Index = B/A = 4.77

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:
Dominant upland vegetation along hillslope.

SOIL

Sampling Point: UP2b-SP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

Matrix color was consistent down to 16 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No indicators present. Plot was very dry.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Billings Bypass - Johnson Lane Interchange City/County: Lockwood / Yellowstone Sampling Date: 9/23/2020

Applicant/Owner: Montana Department of Transportation State: MT Sampling Point: WL2c-SP

Investigator(s): Peterson - DOWL Section, Township, Range: Section 19, T1N, R27E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR G Lat: 45.814701 Long: -108.415581 Datum: NAD 83

Soil Map Unit Name: Thurlow clay loam, 4 to 7 percent slopes (Tc) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:
Wetland data plot for Wetland JI-WL2c, a narrrow, linear, depressional emergent wetland within an unnamed drainage.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Phalaris arundinacea	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species 100	x 2 = 200
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: 100 (A)	200 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:
Depressional area of hydrophytic vegetation made up entirely of reed canary grass.

SOIL

Sampling Point: WL2c-SP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100					silt clay loam	
5-8	10YR 2/1	60					silt clay loam	
	2.5Y 4/1	35	10YR 3/6	5	C	M	silt clay loam	
8-16	2.5Y 5/2	65	10 YR 3/6	15	C	M	silt clay loam	
	10 YR 2/1	20					silt clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

Depleted Matrix at 8 inches below surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- X Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils were moist. Plot taken in the fall. Hydrology likely present in spring and summer. Site still met secondary indicators.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Billings Bypass - Johnson Lane Interchange City/County: Lockwood / Yellowstone Sampling Date: 9/23/2020

Applicant/Owner: Montana Department of Transportation State: MT Sampling Point: UP2c-SP

Investigator(s): Peterson - DOWL Section, Township, Range: Section 19, T1N, R27E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): 3

Subregion (LRR): LRR G Lat: 45.814688 Long: -108.415663 Datum: NAD 83

Soil Map Unit Name: Thurlow clay loam, 4 to 7 percent slopes (Tc) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:
Upland plot to WL2c-SP and Wetland JI-WL2c.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Poa pratensis	70	Yes	FACU
2. Phalaris arundinacea	15	No	FACW
3. Bromus tectorum	10	No	XX
4. Thlaspi arvense	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species 15	x 2 = 30
FAC species _____	x 3 = _____
FACU species 75	x 4 = 300
UPL species _____	x 5 = _____
Column Totals: 90 (A)	330 (B)

Prevalence Index = B/A = 3.66

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:
Dominant upland vegetation along terrace.

SOIL

Sampling Point: UP2c-SP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-12	10YR 3/2	100					silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

Matrix color was consistent down to 12 inches. Very hard-packed soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No indicators present. Plot was very dry.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Billings Bypass - Johnson Lane Interchange City/County: Lockwood / Yellowstone Sampling Date: 9/23/2020

Applicant/Owner: Montana Department of Transportation State: MT Sampling Point: UP3-SP

Investigator(s): Peterson - DOWL Section, Township, Range: Section 19, T1N, R27E

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): LRR G Lat: 45.822317 Long: -108.409787 Datum: NAD 83

Soil Map Unit Name: Fort Collins and Thurlow clay loams, 1 to 4 percent slopes (Ft) NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:
Sample Plot for Coulson Ditch. Previous delineation called the ditch a wetland; however, no hydrophytic vegetation or hydrology was observed. The ditch has not been active for years.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Elaeagnus angustifolia	30	Yes	FACU
2.			
3.			
4.			
	30 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5 feet)			
1. Bromus inermis	80	Yes	UPL
2. Asclepias speciosa	10	No	FAC
3. Apocynum cannabinum	15	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	105 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species _____	x 1 =	_____
FACW species _____	x 2 =	_____
FAC species 25	x 3 =	75
FACU species 30	x 4 =	120
UPL species 80	x 5 =	400
Column Totals: 135 (A)		595 (B)

Prevalence Index = B/A = 4.40

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:
Primarily upland vegetation with some FAC species. Does not meet dominance or prevalence test.

SOIL

Sampling Point: UP3-SP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No _____

Remarks:

Soil pit was not dug given no hydrology or hydrophytic vegetation indicators

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators were present. Only one secondary indicator could be checked, as the plot was taken in the bottom of an inactive channel.

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project Name: Johnson Lane Interchange **2. MDT Project #:** NCDP-MT 56(55) **Control #:** 4199007

3. Evaluation Date: 09/23/2020 **4. Evaluator(s):** Peterson **5. Wetlands/Site #(s):** WL1a and 1b

6. Wetland Location(s): i. Legal: T1N,R27E,30 ;T1N,R27E,19 **Latitude/Longitude:** 45.811382, -108.416899 : 45.814301, -108.409526 :

ii. Approx. Stationing or Mileposts: 25+51 to 28+06 and 14+33 to 16+97

iii. Watershed: 14

Watershed Name, County: Middle Yellowstone, Yellowstone

7. a. Evaluating Agency: MDT

b. Purpose of Evaluation:

1. X Wetlands potentially affected by MDT project

2. __ Mitigation wetlands; pre-construction

3. __ Mitigation wetlands; post-construction

4. __ Other:

8. Wetland size: 1.000 acres (estimated)

9. Assessment area (AA): 0.050 acres (measured)

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
R	EM	A	SI	100.00

Abbreviations: *(see manual for definitions)*

HGM Classes: Riverine (**R**), Depressional (**D**), Slope (**S**), Mineral Soil Flats (**MSF**), Organic Soil Flats (**OSF**), Lacustrine Fringe (**LF**);

Cowardin Classes: Rock Bottom (**RB**), Unconsolidated bottom (**UB**), Aquatic Bed (**AB**), Unconsolidated Shore (**US**), Moss-lichen Wetland (**ML**), Emergent Wetland (**EM**), Scrub-Shrub Wetland (**SS**), Forested Wetland (**FO**)

Modifiers: Excavated (**E**), Impounded (**I**), Diked (**D**), Partly Drained (**PD**), Farmed (**F**), Artificial (**A**)

Water Regimes: Permanent / Perennial (**PP**), Seasonal / Intermittent (**SI**), Temporary / Ephemeral (**TE**)

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)

COMMON

12. General condition of AA:

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) list)

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) AA*		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is >=15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is <= 30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is > 30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is <= 15%.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is <=	moderate disturbance	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is > 30%.	high disturbance	high disturbance	**high disturbance**

Comments: (types of disturbance, intensity, season, etc.): Wetland is a fringe wetland along an irrigation ditch that parallels Old Hardin Road in a heavily developed area (commercial and residential).

ii. Prominent noxious, aquatic nuisance, & other exotic vegetation species: Some reed canary grass and some Canada thistle.

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: Area is heavily developed with Interstate 90, secondary roadways, and commercial and residential development.

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	**Initial Rating**	**Is current management preventing (passive) existence of additional vegetated classes?**		**Modified Rating**
>= 3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	**M**	<-- NO	YES -->	L
1 class, monoculture (1 species comprises >= 90% of total cover)	L	NA	NA	NA

Comments: AA consists for primarily reed canary grass (60 to 90 percent) with beaked sedge making up the second dominant species (10 to 40 percent).

SECTION PERTAINING to FUNCTIONS & VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions): No usable habitat

Primary or critical habitat (list species) **Secondary habitat (list species)** **Incidental habitat (list species)**

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	*doc/primary*	*sus/primary*	*doc/secondary*	*sus/secondary*	*doc/incidental*	*sus/incidental*	*None*
Functional Points and Rating	1H	.9H	.8M	.7M	.3L	.1L	**0L**

Sources for documented use (e.g. observations, records, etc): AA is a small fringe wetland along an irrigation ditch. No suitable habitat for T&E species is present.

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions): No usable habitat

Primary or critical habitat (list species) **Secondary habitat (list species)** **Incidental habitat (list species)**

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	*doc/primary*	*sus/primary*	*doc/secondary*	*sus/secondary*	*doc/incidental*	*sus/incidental*	*None*
***S1 Species:** Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
***S2 and S3 Species:** Functional Points and Rating*	.9H	.7M	.6M	.5M	.2L	.1L	**0L**

Sources for documented use (e.g. observations, records, etc): AA is a small fringe wetland along an irrigation ditch. No suitable habitat for state sensitive species is present.

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (circle substantial, moderate, or low based on supporting evidence):

Substantial (based on any of the following [check]):
- ___ observations of abundant wildlife #s or high species diversity (during any period)
- ___ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ___ presence of extremely limiting habitat features not available in the surrounding area
- ___ interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):
- ___ few or no wildlife observations during peak use periods
- X little to no wildlife sign
- X sparse adjacent upland food sources
- ___ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):
- ___ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ___ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ___ adequate adjacent upland food sources
- ___ interviews with local biologists with knowledge of the AA

ii. Wildlife habitat features (Working from top to bottom, circle appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent vegetated classes must be within 20% of each other interms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms])

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in >=10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	**L**	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Moderate
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	.7M	.5M	.3L
Minimal	.6M	.4M	.2L	**.1L**

Comments: AA is a small fringe wetland along an irrigation ditch in a developed area. Very little suitable habitat is present.

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then mark **X** **NA** and proceed to 14E.)

Type of Fishery: Cold Water **(CW)** ___ Warm Water **(WW)** ___ **Use the CW or WW guidelines in the user manual to complete the matrix**

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [circle] the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.2L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (NOTE: Modified score cannot exceed 1 or be less than 0.1)

a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity or is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support, or do aquatic nuisance plant or animal species (see Appendix E) occur in fish habitat? ___ *If yes, reduce score in i above by 0.1.*

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ___ *If yes, add 0.1 to the adjusted score in **i** or **iia.***

iii. Final Score and Rating: NA **Comments:** The AA is an irrigation ditch. Fish are likely not present and the ditch does not provide suitable habitat.

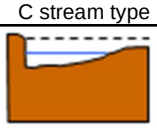
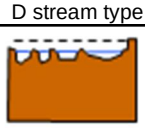
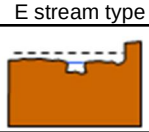
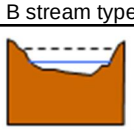
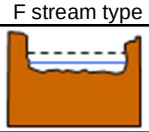
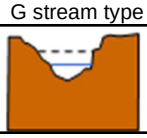
14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, mark ___ **NA** and proceed to 14F.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	**.1L**

Entrenchment ratio (ER) estimation – see User's Manual for additional guidance. Entrenchment ratio = (flood-prone width)/(bankfull width) Flood-prone width = estimated horizontal projection of where 2 x maximum bankfull depth elevation intersects the floodplain on each side of the stream.

8 /	6 =	**1.33**
Flood-prone width	*Bankfull width*	*Entrenchment ratio (ER)*

Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (circle)? ___ **Comments:** A very entrenched irrigation ditch that floods AA during irrigation season. Outlet is unrestricted during the irrigation season.

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, mark ___ **NA** and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			<=1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond **>= 5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	**.3L**	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments: AA floods every year when irrigation flows start in the spring.

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, mark ___ **NA** and proceed to 14H.)

i. Rating

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	>= 70%		< 70%		>= 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	**.9H**	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments: AA is within a developed area with adjacent impervious surfaces. AA receives runoff from adjacent development and roadways.

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, mark ___ **NA** and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of >=6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
>= 65%	1H	**.9H**	.7M
35-64%	.7M	.6M	.5M
35%	.3L	.2L	.1L

Comments: Irrigation flows in the spring and summer. Bank dominated by reed canary grass (stability rating of 9).

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [circle])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	**L**

ii. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14I.i.); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P, S/I, and T/E are as previously defined, and A = "absent" [see instructions for further definitions of these terms].)

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component < 1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1H	.7M	.8H	.5M	.6M	.4M	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.5M	.5M	.3L	**.3L**	.2L
T/E/A	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (NOTE: Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB):** Area with >= 30% plant cover, = 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).

a) Is there an average >= 50 foot-wide vegetated upland buffer around >= 75% of the AA circumference? ___ *If yes, add 0.1 to the score in ii above.*

iv. Final Score and Rating: **0.30L** **Comments:** AA along irrigation ditch that has a surface outlet. Located in developed area. Area around ditch is maintained and mowed periodically.

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

_____ The AA is a slope wetland
_____ Springs or seeps are known or observed
_____ Vegetation growing during dormant season/drought
_____ Wetland occurs at the toe of a natural slope
_____ AA permanently flooded during drought periods
_____ Wetland contains an outlet, but no inlet
_____ Shallow water table and the site is saturated to the surface
_____ Other:

ii. Recharge Indicators

_____ Permeable substrate present without underlying impeding layer
_____ Wetland contains inlet but no outlet
_____ Stream is a known 'losing' stream; discharge volume decreases
_____ Other:

iii. Rating (use the information from i and ii above and the table below to arrive at [circle] the functional points and rating)

	Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*			
Criteria	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information	**N/A**			

Comments: Seasonal irrigation flows. AA likely does not provide groundwater recharge.

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7M	.6M	.6M	.4M	.3L	.3L	**.2L**	.1L

Comments: Common irrigation wetland fringe in the Billings area.

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (circle) ___ (if 'Yes' continue with the evaluation; if 'No' then mark **X** **NA** and proceed to the overall summary and rating page)

ii. Check categories that apply to the AA: ___Educational/scientific study; ___Consumptive rec.; ___Non-consumptive rec.; ___Other :

iii. Rating:

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments: No recreation potential for the AA.

General Site Notes
Low quality emergent fringe along irrigation ditch in developed area.

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): WL1a and 1b

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Wetland Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0.00	1	0.00	
B. MT Natural Heritage Program Species Habitat	L	0.00	1	0.00	
C. General Wildlife Habitat	L	0.10	1	0.01	
D. General Fish Habitat	NA				
E. Flood Attenuation	L	0.10	1	0.01	
F. Short and Long Term Surface Water Storage	L	0.30	1	0.02	*
G. Sediment/Nutrient/Toxicant Removal	H	0.90	1	0.05	*
H. Sediment/Shoreline Stabilization	H	0.90	1	0.05	*
I. Production Export/Food Chain Support	L	0.30	1	0.02	*
J. Groundwater Discharge/Recharge	NA				
K. Uniqueness	L	0.20	1	0.01	
L. Recreation/Education Potential (bonus points)	NA				
Totals:		2.80	9.00	0.17	
Percent of Possible Score			31%		

Category I Wetland: (must satisfy one of the following criteria; otherwise go to Category II)

_____ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**

_____ Score of 1 functional point for Uniqueness; **or**

_____ Score of 1 functional point for Flood Attenuation and answer to Question 14E.ii is "yes"; **or**

_____ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; otherwise go to Category IV)

_____ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**

_____ Score of .9 or 1 functional point for General Wildlife Habitat; **or**

_____ Score of .9 or 1 functional point for General Fish Habitat; **or**

_____ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**

_____ Score of .9 functional point for Uniqueness; **or**

_____ Percent of possible score > 65% (round to nearest whole #).

Category III Wetland: (Criteria for Categories I, II, or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; otherwise go to Category III)

X "Low" rating for Uniqueness; **and**

X Vegetated wetland component 1 acre (do not include upland vegetated buffer); **and**

X Percent of possible score 35% (round to nearest whole #).

OVERALL ANALYSIS AREA RATING: IV

Summary Comments: Low quality emergent fringe along irrigation ditch in developed area.

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project Name: Johnson Lane Interchange **2. MDT Project #:** NCPD-MT 56(55) **Control #:** 4199007

3. Evaluation Date: 09/23/2020 **4. Evaluator(s):** Peterson **5. Wetlands/Site #(s):** Wetland 2a, 2b, 2c

6. Wetland Location(s): i. Legal: T1N,R27E,19 **Latitude/Longitude:** 45.8131, -108.413329 : 45.813955, -108.414523 : 45.814701, -108.415581 :

ii. Approx. Stationing or Mileposts: 17+17 to 21+55 and 1103+99

iii. Watershed: 14

Watershed Name, County: Middle Yellowstone, Yellowstone

7. a. Evaluating Agency: MDT

b. Purpose of Evaluation:

1. X Wetlands potentially affected by MDT project

2. __ Mitigation wetlands; pre-construction

3. __ Mitigation wetlands; post-construction

4. __ Other:

8. Wetland size: 0.359 acres (measured)

9. Assessment area (AA): 0.359 acres (measured)

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
D	EM	NA	SI	100.00

Abbreviations: *(see manual for definitions)*

HGM Classes: Riverine (**R**), Depressional (**D**), Slope (**S**), Mineral Soil Flats (**MSF**), Organic Soil Flats (**OSF**), Lacustrine Fringe (**LF**);

Cowardin Classes: Rock Bottom (**RB**), Unconsolidated bottom (**UB**), Aquatic Bed (**AB**), Unconsolidated Shore (**US**), Moss-lichen Wetland (**ML**), Emergent Wetland (**EM**), Scrub-Shrub Wetland (**SS**), Forested Wetland (**FO**)

Modifiers: Excavated (**E**), Impounded (**I**), Diked (**D**), Partly Drained (**PD**), Farmed (**F**), Artificial (**A**)

Water Regimes: Permanent / Perennial (**PP**), Seasonal / Intermittent (**SI**), Temporary / Ephemeral (**TE**)

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)

COMMON

12. General condition of AA:

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) list)

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) AA*		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is >=15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is <= 30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is > 30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is <= 15%.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is <=	moderate disturbance	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is > 30%.	high disturbance	high disturbance	**high disturbance**

Comments: (types of disturbance, intensity, season, etc.): Wetland is located within an unnamed drainage swale that has been diverted and culverted to accommodate development in the area.

ii. Prominent noxious, aquatic nuisance, & other exotic vegetation species: Reed canary grass and some Canada thistle

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: Lands surrounding the AA are developed and include Interstate 90 and the Johnson Lane Interchange, secondary roads, and commercial and residential development.

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	**Initial Rating**	**Is current management preventing (passive) existence of additional vegetated classes?**		**Modified Rating**
>= 3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	<-- NO	YES -->	L
1 class, monoculture (1 species comprises >= 90% of total cover)	**L**	NA	NA	NA

Comments: Reed canary grass is the dominant species in this wetland system.

SECTION PERTAINING to FUNCTIONS & VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions): No usable habitat

Primary or critical habitat (list species) **Secondary habitat (list species)** **Incidental habitat (list species)**

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	*doc/primary*	*sus/primary*	*doc/secondary*	*sus/secondary*	*doc/incidental*	*sus/incidental*	*None*
Functional Points and Rating	1H	.9H	.8M	.7M	.3L	.1L	**0L**

Sources for documented use (e.g. observations, records, etc): Given the location of the AA and low quality of wetland (all reed canary grass), the AA is not suitable habitat for T&E species.

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions): No usable habitat

Primary or critical habitat (list species) **Secondary habitat (list species)** **Incidental habitat (list species)**

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	*doc/primary*	*sus/primary*	*doc/secondary*	*sus/secondary*	*doc/incidental*	*sus/incidental*	*None*
***S1 Species:** Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
***S2 and S3 Species:** Functional Points and Rating*	.9H	.7M	.6M	.5M	.2L	.1L	**0L**

Sources for documented use (e.g. observations, records, etc): Given the location of the AA and low quality of wetland (all reed canary grass), the AA is not suitable habitat for state species of concern.

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (circle substantial, moderate, or low based on supporting evidence):

Substantial (based on any of the following [check]):

- ___ observations of abundant wildlife #s or high species diversity (during any period)
- ___ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ___ presence of extremely limiting habitat features not available in the surrounding area
- ___ interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):

- ___ few or no wildlife observations during peak use periods
- X little to no wildlife sign
- X sparse adjacent upland food sources
- ___ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):

- ___ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ___ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ___ adequate adjacent upland food sources
- ___ interviews with local biologists with knowledge of the AA

ii. Wildlife habitat features (Working from top to bottom, circle appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent vegetated classes must be within 20% of each other interms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms])

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in >=10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	**L**	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Moderate
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	.7M	.5M	.3L
Minimal	.6M	.4M	.2L	**.1L**

Comments: No structural diversity. AA located in a developed area near the interstate. The AA provides minimal suitable habitat for wildlife species.

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then mark **X** **NA** and proceed to 14E.)

Type of Fishery: Cold Water **(CW)** ___ Warm Water **(WW)** ___ **Use the CW or WW guidelines in the user manual to complete the matrix**

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [circle] the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.2L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (NOTE: Modified score cannot exceed 1 or be less than 0.1)

a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity or is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support, or do aquatic nuisance plant or animal species (see Appendix E) occur in fish habitat? ___ *If yes, reduce score in i above by 0.1.*

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ___ *If yes, add 0.1 to the adjusted score in **i** or **iia.***

iii. Final Score and Rating: NA **Comments:** Seasonal drainage swale that does provide suitable habitat for fish.

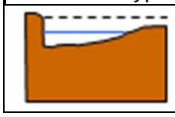
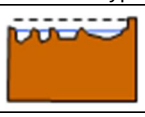
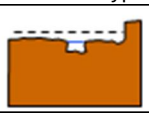
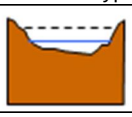
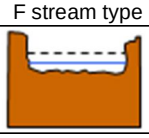
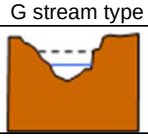
14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, mark **X** **NA** and proceed to 14F.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Entrenchment ratio (ER) estimation – see User's Manual for additional guidance. Entrenchment ratio = (flood-prone width)/(bankfull width) Flood-prone width = estimated horizontal projection of where 2 x maximum bankfull depth elevation intersects the floodplain on each side of the stream.

/	=	
Flood-prone width	*Bankfull width*	*Entrenchment ratio (ER)*

Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (circle)? ___ **Comments:** Wetlands are in a depressional swale and basin that does not have in-channel flow.

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, mark ___ **NA** and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			<=1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond **>= 5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	**.2L**	.1L

Comments: Seasonal flows from upland sources and precipitation may flood these wetlands from time to time. May not occur every year depending on snow melt and precipitation for the year.

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, mark ___ **NA** and proceed to 14H.)

i. Rating

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	>= 70%		< 70%		>= 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	**1H**	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments: AA has several culverts that may restrict the outlet to some degree. AA does receive surface runoff from adjacent sources.

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, mark **X** **NA** and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of >=6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
>= 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
35%	.3L	.2L	.1L

Comments: No standing water subject to wave motion in the AA.

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [circle])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	**L**

ii. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14I.i.); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P, S/I, and T/E are as previously defined, and A = "absent" [see instructions for further definitions of these terms].)

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component < 1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1H	.7M	.8H	.5M	.6M	.4M	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.5M	.5M	.3L	**.3L**	.2L
T/E/A	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (NOTE: Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB):** Area with >= 30% plant cover, = 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).

a) Is there an average >= 50 foot-wide vegetated upland buffer around >= 75% of the AA circumference? ___ *If yes, add 0.1 to the score in ii above.*

iv. Final Score and Rating: **0.30L** **Comments:** AA is primarily within roadway right-of-way limits and see occasional mowing.

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

_____ The AA is a slope wetland
_____ Springs or seeps are known or observed
_____ Vegetation growing during dormant season/drought
_____ Wetland occurs at the toe of a natural slope
_____ AA permanently flooded during drought periods
_____ Wetland contains an outlet, but no inlet
_____ Shallow water table and the site is saturated to the surface
_____ Other:

ii. Recharge Indicators

_____ Permeable substrate present without underlying impeding layer
_____ Wetland contains inlet but no outlet
_____ Stream is a known 'losing' stream; discharge volume decreases
_____ Other:

iii. Rating (use the information from i and ii above and the table below to arrive at [circle] the functional points and rating)

	Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*			
Criteria	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information	**N/A**			

Comments: Some ponding within the AA, wetland 2b, may provide some recharge, but this cannot be reasonably ascertained.

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7M	.6M	.6M	.4M	.3L	.3L	**.2L**	.1L

Comments: Common depressional wetlands found in vegetated swales throughout the Billings area.

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (circle) ___ (if 'Yes' continue with the evaluation; if 'No' then mark **X** **NA** and proceed to the overall summary and rating page)

ii. Check categories that apply to the AA: ___Educational/scientific study; ___Consumptive rec.; ___Non-consumptive rec.; ___Other :

iii. Rating:

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments: There are no recreation or educational opportunities at this AA.

General Site Notes
Low quality wetland within a developed area.

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): Wetland 2a, 2b, 2c

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Wetland Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0.00	1	0.00	
B. MT Natural Heritage Program Species Habitat	L	0.00	1	0.00	
C. General Wildlife Habitat	L	0.10	1	0.04	
D. General Fish Habitat	NA				
E. Flood Attenuation	NA				
F. Short and Long Term Surface Water Storage	L	0.20	1	0.07	*
G. Sediment/Nutrient/Toxicant Removal	H	1.00	1	0.36	*
H. Sediment/Shoreline Stabilization	NA				
I. Production Export/Food Chain Support	L	0.30	1	0.11	*
J. Groundwater Discharge/Recharge	NA				
K. Uniqueness	L	0.20	1	0.07	*
L. Recreation/Education Potential (bonus points)	NA				
Totals:		1.80	7.00	0.65	
Percent of Possible Score			26%		

Category I Wetland: (must satisfy one of the following criteria; otherwise go to Category II)

_____ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**

_____ Score of 1 functional point for Uniqueness; **or**

_____ Score of 1 functional point for Flood Attenuation and answer to Question 14E.ii is "yes"; **or**

_____ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; otherwise go to Category IV)

_____ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**

_____ Score of .9 or 1 functional point for General Wildlife Habitat; **or**

_____ Score of .9 or 1 functional point for General Fish Habitat; **or**

_____ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**

_____ Score of .9 functional point for Uniqueness; **or**

_____ Percent of possible score > 65% (round to nearest whole #).

Category III Wetland: (Criteria for Categories I, II, or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; otherwise go to Category III)

X "Low" rating for Uniqueness; **and**

X Vegetated wetland component 1 acre (do not include upland vegetated buffer); **and**

X Percent of possible score 35% (round to nearest whole #).

OVERALL ANALYSIS AREA RATING: IV

Summary Comments: Low quality wetland within a developed area.

Attachment 3: Johnson Lane Interchange Noise Addendum Report

BILLINGS BYPASS-JOHNSON LANE INTERCHANGE
NCDP-MT 56(55), UPN 4199007
DETAILED NOISE ANALYSIS

Prepared for:

MONTANA MDT DEPARTMENT OF TRANSPORTATION

and

DOWL, Inc.

Completed by:

Big Sky Acoustics

December 1, 2021

BILLINGS BYPASS-JOHNSON LANE INTERCHANGE
NCDP-MT 56(55), UPN 4199007
DETAILED NOISE ANALYSIS

EXECUTIVE SUMMARY

The Montana Department of Transportation (MDT) is planning to develop the 4th segment of the Billings Bypass (BBP), by reconstructing the Interstate 90 (I-90) Johnson Lane Interchange and associated roadways (i.e., I-90 on/off ramps, Johnson Lane, Old Hardin Road, Cole Street, Becraft Lane, North Frontage Road and Sannon Boulevard) in Lockwood, Montana (**Figure 1**, attached). The BBP-Johnson Lane Interchange Project is bisected by I-90 (west/east) and Johnson Lane (north/south), and will include a new Diverging Diamond interchange, alignment shifts, additional travel lanes, modified intersections, new and upgraded traffic signals, etc. (DOWL 2021a).

This Detailed Noise Analysis for the BBP-Johnson Lane Interchange Project was completed by Big Sky Acoustics (BSA) according to the U.S. Code of Federal Regulations Part 772 (23 CFR 772) *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (2011), and MDT's *Traffic Noise Analysis and Abatement Policy* (MDT 2017). The intent of the noise study was to evaluate existing traffic noise levels at noise-sensitive receptors, and predict noise levels due to vehicles traveling on the reconstructed roadways (**Figure 1**). The Record of Decision and Final Environmental Impact Statement (EIS) for the complete BBP project (Segments 1 through 6) were finalized in 2014, and sections have been updated subsequently (MDT 2014a, MDT 2014b). The attached report revises BSA's 2012 BBP *Traffic Noise Impact Assessment* (BSA 2012) (used in the EIS analysis) for this Segment 4-Johnson Lane Interchange section only, and includes traffic noise analyses for the additional roadways located north and south of I-90 that were not included in BSA's 2012 analysis.

The BBP-Johnson Lane Interchange Project is located within a suburban area, with agriculture/farm, commercial, hotel, industrial, medical facilities, offices, residential, restaurant/bar, and retail land uses located within 500 feet of the edge of the closest travel lane. The Project was evaluated as a Type I project per 23 CFR 772 due the major modifications of the Johnson Lane Interchange, the significant horizontal alignment shift and construction of the North Frontage Road in a new location, and the addition of through-traffic lanes (MDT 2017). For the noise analysis, BSA evaluated traffic noise level impacts for the No Build Alternative (i.e., not reconstructing the interchange or roads) and for the Build Alternative.

For traffic noise studies, the equivalent noise level during a one-hour period, $L_{eq}(h)$ is used. The units of the $L_{eq}(h)$ are A-weighted decibels (dBA). The equivalent noise level is defined as the steady state noise level that has the same acoustical energy as the actual, time-varying noise signal during the same time period. The $L_{eq}(h)$ metric is useful for traffic noise studies because it uses a single number to describe the constantly fluctuating noise levels at a receptor location as vehicles pass by during a one-hour period.

The Federal Highway Administration (FHWA) and MDT identify traffic noise impacts according to Noise Abatement Criteria (NAC) for various land uses and zoning (FHWA 2010, MDT 2017). For Activity Category B and C land uses, such as residences, churches, medical facilities, recreation areas, etc., the exterior NAC is 67 dBA. Therefore, traffic noise impacts occur if the

predicted traffic noise levels are 66 dBA or greater in the Design Year of a project, or if the predicted traffic noise levels are 13 dBA higher than the Present Year noise levels. Activity Category C land uses, such as churches and medical facilities, also have an interior NAC of 52 dBA that is used when no exterior uses are present. For Activity Category E land uses, such as hotels, offices, and restaurants/bars, the exterior NAC is 72 dBA. Activity Category F land uses, such as agriculture, industrial and retail facilities, as well as undeveloped lands that are not currently permitted for development (Activity Category G), do not have a NAC and were not evaluated for this noise analysis (**Table 3-1**).

BSA evaluated traffic noise level impacts for both the No Build and Build Alternatives for this Segment 4 BBP-Johnson Lane Interchange Project (**Figure 1**). BSA completed six noise level measurements in July 2021 to determine the existing ambient noise levels within the project limits (**Section 4.1**), and to verify that the TNM computer models used to predict the traffic noise levels were reasonably accurate (**Section 4.2**). Noise-sensitive receptors were identified within approximately 500 feet of the edge of the closest travel lane. A total of 51 noise-sensitive receptors are depicted on **Figures 2 and 3** (attached), including 35 single-family and mobile home residences, three medical offices, one hotel, two offices, and 10 restaurants/bars.

The TNM-predicted traffic noise levels for both the No Build and Build Alternatives are summarized in **Table 5-1**. Three traffic noise impacts are predicted due to the No Build Alternative in the Present Year (2019) and six impacts in the Design Year (2042). For the Build Alternative, 10 traffic noise impacts are predicted in the Design Year. As shown on **Figure 2**, the Firth Street neighborhood will be bisected by the new North Frontage Road alignment. Subsequently, five residences (Receptors J2, J3, J10, J11 and J13) are planned to be relocated for this Project, and four of these relocated residences are also predicted to be noise-impacted (**Table 5-1**). However, the highest Build Alternative Design Year traffic noise level (L_{eq}(h) 69 dBA) is predicted for the remaining Receptor J1 that may also need to be relocated due to right-of-way (ROW) and/or property access issues.

As shown on **Figure 3** and in **Table 5-1**, three residences (Receptors H1, H3 and H4) located adjacent to Old Hardin Road and west of the intersection with Johnson Lane are noise-impacted, and currently experiencing high traffic noise levels (No Build Alternative-Present Year). Traffic noise impacts are also predicted for these same residences plus an additional two mobile homes (Receptors H1-2 and H2) for the No Build and Build Alternatives in the Design Year (2042).

Because traffic noise impacts were predicted, BSA evaluated traffic noise mitigation measures and determined if the measures are reasonable or feasible (**Section 6.0**), including the construction of noise barriers, modifying the proposed build alternatives, acquisition of real property, and traffic management measures. Five Firth Street noise-impacted receptors located adjacent to Receptor J1 are currently planned to be relocated for this Project (**Figure 2**), and therefore, a barrier is not feasible for one receptor (J1). BSA evaluated the reasonableness for a barrier for the mobile home park located adjacent to Old Hardin Road along Rykken Circle (**Figure 3**). The CEI results are summarized in **Table 6-1**, however, a barrier wall would not meet MDT's noise reduction design goal, and the CEI values are above MDT's reasonableness criteria. Therefore, barriers are not reasonable for traffic noise mitigation of the Build Alternative.

In order to eliminate the noise-impact at Receptor J1 (**Figure 2**), the Johnson Lane alignment north of I-90 would need to shift 150 feet west, which is not feasible. Additionally, the mobile home park at Old Hardin Road and Rykken Circle (**Figure 3**) is located at the west end of the project limits, and moving the alignment north is not feasible when realigning to the existing configuration.

Traffic control devices are already included in the Project design (DOWL 2021a). Restricting certain vehicle types, limiting the time of day that certain vehicles may use the roads, exclusive lane designations or changing the speed limits are also not reasonable mitigation measures for the connectivity of the BBP and the functionality of the Project. However, to avoid future traffic noise impacts in Activity Category G undeveloped lands, BSA determined the minimum setback distances from the nearest Build Alternative centerline to where the Design Year L_{eq}(h) 60 and 64 dBA noise levels are predicted to occur (**Table 7-1**). Local officials should strongly encourage developers to incorporate noise-compatible planning measures to avoid traffic noise problems in the future (MDT 2008).

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1.0 INTRODUCTION

The Montana Department of Transportation (MDT) is planning to develop the 4th segment of the Billings Bypass (BBP), by reconstructing the Interstate 90 (I-90) Johnson Lane Interchange and associated roadways (i.e., I-90 on/off ramps, Johnson Lane, Old Hardin Road, Cole Street, Becraft Lane, North Frontage Road and Sannon Boulevard) in Lockwood, Montana (**Figure 1**, attached). The BBP-Johnson Lane Interchange Project is bisected by I-90 (west/east) and Johnson Lane (north/south), and will include a new Diverging Diamond interchange, alignment shifts, additional travel lanes, modified intersections, new and upgraded traffic signals, etc. (DOWL 2021a).

This Detailed Noise Analysis for the BBP-Johnson Lane Interchange Project was completed by Big Sky Acoustics (BSA) according to the U.S. Code of Federal Regulations Part 772 (23 CFR 772) *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (2011), and MDT's *Traffic Noise Analysis and Abatement Policy* (MDT 2017). The intent of the noise study was to evaluate existing traffic noise levels at noise-sensitive receptors, and predict noise levels due to vehicles traveling on the reconstructed roadways (**Figure 1**). The Record of Decision and Final Environmental Impact Statement (EIS) for the complete BBP project (Segments 1 through 6) were finalized in 2014, and sections have been updated subsequently (MDT 2014a, MDT 2014b). The attached report revises BSA's 2012 BBP *Traffic Noise Impact Assessment* (BSA 2012) (used in the EIS analysis) for this Segment 4-Johnson Lane Interchange section only, and includes traffic noise analyses for the additional roadways located north and south of I-90 that were not included in BSA's 2012 analysis.

The Project is located in Yellowstone County and within the City of Lockwood. As shown on **Figure 1**, in the northern section of the Project, the east and west sections of the North Frontage Road will be realigned, creating a 4-way signalized intersection with Johnson Lane, and the existing alignment will shift approximately 410 feet north. This intersection portion of the new North Frontage Road alignment will be constructed on undeveloped land and on the eastern portion of the Town Pump parking lot west of Johnson Lane, and through portions of the neighborhood located along Firth Street east of Johnson Lane. The eastern segment of the North Frontage Road will intersect with Sannon Boulevard approximately 0.3 miles east of Johnson Lane. Sannon Boulevard will be realigned with an "S" configuration extending north from the North Frontage Road and intersecting with Coulson Road (DOWL 2021a). Modifications to Coulson Road and the intersection with Johnson Lane are planned for the Segment 5 BBP-Johnson Lane Interchange-Railroad Overpass project, that is scheduled to be constructed after this Project (DOWL 2021b, MDT 2021).

Johnson Lane will be reconstructed with a new Diverging Diamond interchange, traffic signals, and modified I-90 on/off ramps (**Figure 1**). The Johnson Lane improvements will begin about 760 feet south of Old Hardin Road, extend under I-90 and 0.6 miles north where it will terminate at the existing intersection with Coulson Road. The Johnson Lane/Old Hardin Road intersection will be widened to accommodate the additional travel lanes, turn lanes and an updated traffic signal. The Old Hardin Road improvements, which includes a shift in alignment to accommodate the new lane configuration, will extend approximately 0.2 miles west and 0.27 miles east of the intersection with Johnson Lane. A traffic signal will be constructed to accommodate the new traffic and turn lanes at the intersection of Old Hardin Road and Cole Street. Cole Street will be improved north and south of Old Hardin Road, and the south leg will extend nearly 500 feet and tie into a modified intersection with Becraft Lane (DOWL 2021a).

The BBP-Johnson Lane Interchange Project is located within a suburban area, with agriculture/farm, commercial, hotel, industrial, medical facilities, offices, residential, restaurant/bar, and retail land uses located within 500 feet of the edge of the closest travel lane. The Project was evaluated as a Type I project per 23 CFR 772 due the major modifications of the Johnson Lane Interchange, the significant horizontal alignment shift and construction of the North Frontage Road in a new location, and the addition of through-traffic lanes (MDT 2017). For the noise analysis, BSA evaluated traffic noise level impacts for the No Build Alternative (i.e., not reconstructing the interchange or roads) and for the proposed Build Alternative. Based on MDT's traffic and design data provided, BSA evaluated the Project with a Present Year of 2019 and Design Year of 2042 (MDT 2019, DOWL 2021a).

2.0 TERMINOLOGY

Noise levels are quantified using units of decibels (dB). Noise levels can also be expressed as A-weighted decibels (dBA). Humans typically have reduced hearing sensitivity at low frequencies compared with their response at high frequencies, and the A-weighting of noise levels closely correlates to the frequency response of normal human hearing. By utilizing A-weighted noise levels in a study, a person's response to noise can be assessed. Decibels are logarithmic values, and cannot be combined using normal algebraic addition. For example, the combined noise level of two 50-dBA noise sources would be 53 dBA, not 100 dBA.

When traveling from a noise source to a receptor in an outdoor environment, noise levels decrease with increasing distance between the source and receptor. Traffic noise levels typically decrease between 3 and 4.5 dBA every time the distance between the road and receptor is doubled, depending on the characteristics of the source and the conditions over the path that the noise travels. The reduction in noise levels can be increased if a solid barrier, such as a man-made wall, or natural topography is located between the source and receptor.

The ambient noise at a receptor location in a given environment is the all-encompassing sound associated with that environment, and is due to the combination of noise sources from many directions, near and far, including the noise source of interest. The background noise at a given location is due to any sources that are not associated with the noise source of interest.

For environmental noise studies, ambient noise levels and noise impact criteria are typically based on A-weighted equivalent noise levels, L_{eq}, during a certain time period. The equivalent noise level during a one-hour period is represented as $L_{eq}(h)$ and is the metric used by Federal Highway Administration (FHWA) and MDT for traffic noise studies. The equivalent noise level is defined as the steady state noise level that has the same acoustical energy as the actual, time-varying noise signal during the same time period. The $L_{eq}(h)$ metric is useful for traffic noise studies because it uses a single number to describe the constantly fluctuating ambient noise levels at a receptor location during one hour of time.

3.0 ACTIVITY CATEGORIES AND NOISE ABATEMENT CRITERIA

23 CFR 772 outlines the procedures to determine if traffic noise impacts will occur for a project and when traffic noise abatement measures will be considered. FHWA and MDT identify traffic noise impacts according to Noise Abatement Criteria (NAC) for various land uses and zoning (FHWA 2010, MDT 2017). MDT's Noise Policy (2017) and 23 CFR 772 (2011) state that traffic

noise impacts occur for highway projects when the predicted $L_{eq}(h)$ noise level at a receptor location in a project's Design Year approaches or exceeds the NAC values listed in **Table 3-1**, or when the predicted traffic noise levels in the Design Year substantially exceed the existing ambient noise levels at a receptor. In determining and abating traffic noise impacts, 23 CFR 772, Section 772.11–*Noise Abatement*, gives primary consideration to receptor locations that represent exterior areas where frequent human use occurs and a lowered noise level would be of benefit. MDT defines "approach" as 1 dBA, and "substantially exceed" as 13 dBA (MDT 2017).

For Activity Category B and C land uses, such as residences, churches, medical facilities, recreation areas, etc., the exterior NAC is 67 dBA. Therefore, traffic noise impacts occur if the predicted traffic noise levels are 66 dBA or greater in the Design Year of a project, or if the predicted traffic noise levels are 13 dBA higher than the Present Year noise levels. Activity Category C land uses, such as churches and medical facilities, also have an interior NAC of 52 dBA that is used when no exterior uses are present. For Activity Category E land uses, such as hotels, offices, and restaurants/bars, the exterior NAC is 72 dBA. Activity Category F land uses, such as agriculture, industrial and retail facilities, as well as undeveloped lands that are not currently permitted for development (Activity Category G) and are located within the project limits, do not have a NAC and were not evaluated for this noise analysis (**Table 3-1**). When traffic noise impacts are identified at noise-sensitive receptor locations, MDT considers reasonable and feasible noise abatement measures to reduce traffic noise levels at a receptor (MDT 2017).

Table 3-1: Noise Abatement Criteria

Activity Category	Activity Criteria[1] $L_{eq}(h)$ dBA	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[2]	67	Exterior	Residential
C[2]	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio stations, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E[2]	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D, or F.
F	---	---	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities, (water resources, water treatment, electrical), and warehousing.
G	---	---	Undeveloped lands that are not permitted.

Source: MDT 2017

Notes:

[1] The $L_{eq}(h)$ Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures.

[2] Includes undeveloped lands permitted for this Activity Category.

Underlined designates receptors identified within 500 feet of the edge of the closest travel lane in the project limits.

4.0 AFFECTED ENVIRONMENT

4.1 Ambient Noise Measurements

BSA completed six noise level measurements on July 26–27, 2021 to determine the existing ambient noise levels at representative locations near receptors. The measurements were 30 to 60 minutes in duration, and the $L_{eq}(h)$ for each one-hour period was calculated from the measurement data. The measurement locations are depicted on **Figures 2 and 3**, attached.

BSA conducted the ambient noise level measurements using Larson Davis Model 831 and CEL Instruments Model 593 Type I Sound Level Meters with preamplifiers and 0.5-inch diameter microphones. The meters were calibrated using a CEL Instruments Model 284/2 Acoustical Calibrator prior to and checked after each measurement. The sound level meters were set to "slow" response per FHWA requirements (FHWA 2010). The sound level meters were mounted on tripods such that the microphones were approximately 5 feet above the ground surface, and windscreens were used over the microphones. Temperature, relative humidity and wind speed were measured using a Kestrel 3000 meter. **Table 4-1** summarizes the measured ambient $L_{eq}(h)$ noise levels, and **Table 4-2**, on the next page, summarizes the atmospheric conditions during the field measurements.

Table 4-1: Outdoor Ambient Noise Level Measurements

Meas. Location (Figures 2 & 3)	Date & Time (hours)	Description	Approx. Distance & Direction from Nearest Centerline	Measured $L_{eq}(h)$ (dBA)	Dominant Noise Sources during Measurements[3]
1	7/26/21 1622 to 1722	Northwest corner of intersection of Becraft Lane & Cole Street, across from residences	42 feet north of Becraft Lane	62 dBA	Rush hour traffic on Becraft Lane, and diesel pick-up trucks pulling trailers
2	7/26/21 1636 to 1706	Southwest corner of intersection of Old Hardin Road & Rykken Circle (west) in mobile home park	55 feet south of Old Hardin Road	63 dBA[1]	Rush hour traffic & heavy trucks on Old Hardin Road, and an idling truck in trailer park
3	7/26/21 1733 to 1803	North side of Old Hardin Road, south of Holiday Inn Express, west of residences, and north of the Cole Street shopping center	67 feet north of Old Hardin Road	61 dBA[1]	Rush hour traffic on Old Hardin Road
4	7/27/21 0859 to 0929	East side of Johnson Lane, and west of Firth Street residences	70 feet east of Johnson Lane	62 dBA[1]	Steady traffic & heavy trucks on Johnson Lane, Coulson Road, North Frontage Road & I-90, passing train (and horn), and barking dogs
5	7/27/21 1005 to 1035	West side of Firth Street at the driveway and mailbox of the 1044 Firth Street residence	25 feet west of Firth Street	57 dBA[1]	Steady traffic & heavy trucks on Johnson Lane, Coulson Road, North Frontage Road & I-90, passing train (and horn), and aircraft
6	7/27/21 1104 to 1204	North side of Coulson Road (south of railroad tracks) and across from residences	64 feet north of Coulson Road	60 dBA[2]	Steady traffic & heavy trucks on Coulson Road, three passing trains (and horns), and aircraft

Notes:

[1] The $L_{eq}(h)$ noise level was calculated from the 30-minute measurement data.

[2] The measured noise level at Location 6 (72 dBA) was heavily influenced by three passing trains and horns at the at-grade railroad crossing at Johnson Lane. Therefore, the train data was removed to calculate the $L_{eq}(h)$ noise level due to traffic.

[3] Traffic on I-90 was audible from all measurement locations, especially during low traffic periods on the adjacent roads.

Table 4-2: Atmospheric Conditions during the Noise Level Measurements

Measurement Locations	Date & Time (hours)	Temperature	Relative Humidity	Conditions & Wind Speed/Direction
1, 2 & 3	7/26/21 1620 to 1800	100.5 to 102°F	16%	Hazy from wildfire smoke and calm
4 & 5	7/27/21 0900 to 1030	76°F	30%	Hazy and 3 to 9 mph from south
6	7/27/21 1100 to 1200	93 to 95°F	18 to 20%	Hazy and calm

4.2 Creating and Verifying the Traffic Noise Model

BSA predicted traffic noise levels at the receptors for the No Build and Build Alternatives using the FHWA-approved Traffic Noise Model (TNM), Version 2.5 software (FHWA 2010). This section describes the information and assumptions that were used to create the TNM models which predicts the noise due to moving vehicles. The ambient noise level measurements taken by BSA (**Table 4-1**) were used to verify that the TNM models were reasonably accurate for the No Build and Build Alternatives.

TNM 2.5 uses a three-dimensional coordinate system (x, y, and z) to define the location of the roads, receptor locations and terrain elevations. The number and type of vehicles traveling on the roads that were tallied during the measurements, the approximate speed of the traffic, the location of the centerlines of the driving lanes, the ground elevations between the measurement locations and the roads, and the measurement locations were entered into the models. Topographic elevations of the receptor locations, the roadway conditions, and the location of the proposed Build Alternative were based on Preliminary Plan in Hand Road Plans and updated line work (DOWL 2021a, DOWL 2021b).

Table 4-3 on the next page lists the traffic data BSA counted during the field measurements, and the measured ambient and TNM-predicted noise levels. BSA counted the traffic on the road(s) closest to and with a clear line of sight from the measurement locations. The traffic count data were used to compare the field-measured noise levels to the traffic noise levels predicted by the TNM models at the measurement locations. Measurement Location 6 was heavily influenced by three passing trains and horns at the at-grade railroad crossing at Johnson Lane, and therefore, the train data was removed to calculate the $L_{eq}(h)$ noise level due to traffic.

For all measurements, the calculated difference between each field-measured $L_{eq}(h)$ noise level and the level predicted by the TNM models for the traffic conditions during each measurement period was 1 to 2 dBA. A difference of +/- 3 dBA between measured and predicted traffic noise levels indicates that the TNM models are reasonably accurate (MDT 2017). Therefore, the TNM models are reasonably accurate and acceptable for traffic noise level predictions at the receptor locations (**Table 4-3**).

Table 4-3: Measured Ambient vs. Predicted Noise Levels

Meas. Location (Figures 2 & 3)	Date & Time (hours)	Approx. Distance & Direction from Nearest Centerline	Road and Directional Traffic Tallied During Measurement	Road and Directional Traffic Tallied During Measurement[1]	Measured $L_{eq}(h)$	Predicted $L_{eq}(h)$ by TNM Model
1	7/26/21 1622 to 1722	42 feet north of Becraft Lane	**Becraft Lane Eastbound** Autos: 227 MT: 14 HT: 0	**Becraft Lane Westbound** Autos: 120 MT: 3 HT: 1	62 dBA	61 dBA
			Cole Street Northbound Autos: 6 MT: 0 HT: 0	**Cole Street Southbound** Autos: 3 MT: 1 HT: 0		
2	7/26/21 1636 to 1706	55 feet south of Old Hardin Road	**Old Hardin Road Eastbound[1]** Autos: 198 MT: 8 HT: 4	**Old Hardin Road Westbound[1]** Autos: 156 MT: 12 HT: 2	63 dBA[2]	61 dBA
3	7/26/21 1733 to 1803	67 feet north of Old Hardin Road	**Old Hardin Road Eastbound[1]** Autos: 318 MT: 8 HT: 6	**Old Hardin Road Westbound[1]** Autos: 160 MT: 6 HT: 2	61 dBA[2]	60 dBA
4	7/27/21 0859 to 0929	70 feet east of Johnson Lane	**Johnson Lane Northbound[1]** Autos: 28 MT: 10 HT: 14	**Johnson Lane Southbound[1]** Autos: 38 MT: 6 HT: 28	62 dBA[2]	61 dBA
5	7/27/21 1005 to 1035	25 feet west of Firth Street	**I-90 Eastbound[3]** Autos: NA MT: NA HT: NA **I-90 Eastbound Offramp[3]** Autos: NA MT: NA HT: NA **North Frontage Road Eastbound[1]** Autos: 16 MT: 2 HT: 2 **Firth Street Northbound[1]** Autos: 4 MT: 2 HT: 2 **Johnson Lane Northbound[1]** Autos: 14 MT: 6 HT: 24	**I-90 Westbound[1]** Autos: 430 MT: 56 HT: 60 **I-90 Westbound Offramp[1]** Autos: 34 MT: 6 HT: 30 **North Frontage Road Westbound[1]** Autos: 12 MT: 4 HT: 6 **Firth Street Southbound[1]** Autos: 0 MT: 0 HT: 0 **Johnson Lane Southbound[1]** Autos: 14 MT: 8 HT: 22	57 dBA[2]	56 dBA
6	7/27/21 1104 to 1204	64 feet north of Coulson Road	**Coulson Road Eastbound** Autos: 48 MT: 10 HT: 20	**Coulson Road Westbound** Autos: 48 MT: 7 HT: 24	60 dBA[4]	62 dBA

Notes:

Autos Automobiles – 2-axle, 4-wheel vehicles including pickup trucks (FHWA Vehicle Classes 1 – 3)

MT Medium trucks – 2-axle, 6-wheel vehicles, plus automobiles pulling trailers (FHWA Vehicle Classes 4 – 5)

HT Heavy trucks – 3 or more axles (FHWA Vehicle Classes 6 – 16)

1 Traffic tallied during the 30-minute measurement periods was doubled to estimate 1-hour total traffic counts.

2 The $L_{eq}(h)$ was calculated from the 30-minute measurement data.

3 I-90 eastbound traffic was not visible from Measurement Location 5.

4 The measured noise level at Location 6 ($L_{eq}(h)$ 72 dBA) was heavily influenced by three passing trains and horns at the at-grade railroad crossing at Johnson Lane. Therefore, the train data was removed to calculate the $L_{eq}(h)$ noise level due to traffic.

4.3 Traffic Data Used for the Traffic Noise Predictions

BSA calculated the traffic noise levels for the No Build and Build Alternatives for the Project using TNM modeling (**Section 5.0**). BSA used three sources of traffic data for the noise analysis, including MDT's Traffic Data Collection and Analysis Section data (MDT 2019), MDT's online Arc-GIS Montana Traffic Data (MDT 2021b), and DOWL's updated traffic data for the modified alignments (DOWL 2021b). BSA calculated the traffic data for a Present Year of 2019, a projected Design Year of 2042, an Average Annual Daily Traffic (AADT), and Design Hourly Volume (DHV) per vehicle class for the Project roads. **Table 4-4** shows the traffic data BSA used for the TNM noise level predictions.

Table 4-4: Traffic Data Used for Noise Level Predictions

Road	Posted Speed	Design Condition	Year	AADT	DHV	Autos	MT	HT
Becraft Lane-East[2, 4]	35 mph	No Build	2019	5410	490	97.2%	2.2%	0.6%
			2042	6800	610			
		Build Alternative	2042					
Becraft Lane-West[2, 4]	35 mph	No Build	2019	1130	100	97.2%	2.2%	0.6%
			2042	1420	130			
		Build Alternative	2042					
Cole Street[1, 2, 4]	25 mph	No Build	2019	5630	510	97.2%	2.2%	0.6%
			2042	7080	640			
		Build Alternative	2042					
Old Hardin Road-East	35 mph	No Build	2019	6430	740	97.2%	2.2%	0.6%
			2042	8080	930			
		Build Alternative	2042					
Old Hardin Road-West	35 mph	No Build	2019	4480	500	83.8%	3.9%	12.3%
			2042	5630	630			
		Build Alternative	2042					
Johnson Lane (South of Old Hardin Rd)	35 mph	No Build	2019	2070	290	91.6%	5.1%	3.3%
			2042	3820	540			
		Build Alternative	2042					
Johnson Lane (Between Old Hardin & I-90)	35 mph	No Build	2019	13460	1472	89.3%	3.4%	7.3%
			2042	16920	1850			
		Build Alternative	2042					
I-90 (Eastbound & Westbound)	65 mph	No Build	2019	22460	2380	80.7%	2%	17.3%
			2042	33850	3590			
		Build Alternative	2042					
I-90 Eastbound Offramp[3]	decelerating	No Build	2019	5140	545	80.7%	2%	17.3%
			2042	6460	685			
		Build Alternative	2042					
I-90 Eastbound Onramp[3]	accelerating	No Build	2019	2200	233	80.7%	2%	17.3%
			2042	2780	295			
		Build Alternative	2042					
I-90 Westbound Offramp[3]	decelerating	No Build	2019	1960	208	80.7%	2%	17.3%
			2042	2464	261			
		Build Alternative	2042					
I-90 Westbound Onramp[3]	accelerating	No Build	2019	5210	552	80.7%	2%	17.3%
			2042	6550	694			
		Build Alternative	2042					
Johnson Lane (Between I-90 & N. Frontage Rd)	35 mph	No Build	2019	13460	1550	89.3%	2.3%	8.4%
			2042	16920	1950			
		Build Alternative	2042					

Table 4-4: Traffic Data Used for Noise Level Predictions

Road	Posted Speed	Design Condition	Year	AADT	DHV	Autos	MT	HT
Johnson Lane (North of N. Frontage Rd)	35 mph	No Build	2019	2120	246	84.4%	3.7%	11.9%
			2042	2670	310			
		Build Alternative	2042					
North Frontage Road-East	45 mph	No Build	2019	1060	96	82.1%	3.9%	14%
			2042	1330	120			
		Build Alternative	2042					
North Frontage Road-West	45 mph	No Build	2019	8180	740	82.1%	3.9%	14%
			2042	10280	930			
		Build Alternative	2042					
Sannon Boulevard[1, 2, 5]	30 mph	No Build	2019	860	80	82.1%	3.9%	14%
			2042	1080	100			
		Build Alternative	2042					
Coulson Road[1, 6]	50 mph	No Build	2019	2120	246	84.4%	3.7%	11.9%
			2042	2670	310			
		Build Alternative	2042					

Sources: MDT 2019, MDT 2021b, DOWL 2021b

Notes:

[1] BSA assumed traffic data would be divided equally in both directions.

[2] AADT was provide as a range, so BSA used the highest range data for a worst-case scenario (DOWL 2021b).

[3] For the I-90 ramps, BSA used the same vehicle class mix as the I-90 main line.

[4] For Becraft Lane and Cole Street, BSA used the same vehicle class mix as Old Hardin Road-East.

[5] For Sannon Boulevard, BSA used the same vehicle class mix as North Frontage Road-East.

[6] For Coulson Road, BSA used the same traffic volume and vehicle class mix as Johnson Lane north of the North Frontage Road.

AADT Average Annual Daily Traffic

DHV Design Hourly Volume

Autos Automobiles – 2-axle, 4-wheel vehicles including pickup trucks (FHWA Vehicle Classes 1 – 3)

MT Medium trucks – 2-axle, 6-wheel vehicles, plus automobiles pulling trailers (FHWA Vehicle Classes 4 – 5)

HT Heavy trucks – 3 or more axles (FHWA Vehicle Classes 6 – 16)

5.0 ENVIRONMENTAL CONSEQUENCES

The purpose of the traffic noise level predictions is to determine if traffic noise impacts will occur at noise-sensitive receptor locations in the Design Year (2042). Noise-sensitive receptors were identified within approximately 500 feet of the edge of the closest travel lane using aerial photographs and BSA's fieldwork observations in July 2021. A total of 51 noise-sensitive receptors are depicted on **Figures 2 and 3**. As categorized in **Table 3-1**, the receptors evaluated included 35 single-family and mobile home residences (i.e., 32 first-row and three second-row) (Activity Category B), three medical offices (Activity Categories C/D), one hotel, two offices (i.e., banks) and 10 restaurants/bars (Activity Category E). Some agriculture/farm uses and numerous industrial and retail facilities are also located within 500 feet of the project limits. However, these Activity Category F uses, and undeveloped lands that are not currently permitted (Activity Category G), do not have an NAC and were not evaluated for this noise analysis (MDT 2017). No planned or proposed subdivisions or new developments were identified adjacent to the project limits (Yellowstone County 2021).

5.1 Results and Discussion – No Build vs. Build Alternatives

The TNM-predicted traffic noise levels for both the No Build and Build Alternatives are summarized in **Table 5-1**. As shown, for the noise-sensitive receptors located adjacent to the Project roads, three traffic noise impacts are predicted due to the No Build Alternative in 2019 (i.e., not building the Project in the Present Year), and six impacts in the Year 2042 (i.e., not building the Project in the Design Year). For the Build Alternative (i.e., constructing the proposed BBP-Johnson Lane Interchange Project), 10 traffic noise impacts are predicted in the Design Year (2042) as discussed after **Table 5-1**. Because traffic noise impacts were predicted for the Project, BSA evaluated noise mitigation measures (**Section 6.0**).

Table 5-1: Predicted Traffic Noise Levels

Receptor Number (Figures 2–3)	Description	Land Use Category (Table 3-1)	Impact Criteria[a] (Table 3-1)	No Build Alternative Present Year 2019 L_{eq}(h) (dBA)	No Build Alternative Design Year 2042 L_{eq}(h) (dBA)	Build Alternative Design Year 2042 L_{eq}(h) (dBA)	Build Alt Design Year minus No Build Alt Present Year[a]
J1[f]	Mobile home	B	66	63	64	69	6
J2[d]	Mobile home	B	66	61	62	67	Relocate
J3[d]	Single-family residence	B	66	59	60	64	Relocate
J5	Mobile home	B	66	61	62	65	4
J6[e, f]	Mobile home	B	66	57	59	60	3
J7[e, f]	Mobile home	B	66	60	61	62	2
J8[f]	Mobile home	B	66	56	58	58	2
J9[f]	Single-family residence	B	66	56	58	58	2
J10[d]	Single-family residence	B	66	62	64	66	Relocate
J11[d]	Single-family residence	B	66	61	63	NC	Relocate
J12[f]	Mobile home	B	66	57	58	59	2
J13[d]	Single-family residence	B	66	64	66	66	Relocate
J14	McDonald's / MT Lil's Casino/bar	E	71	60	61	63	3
H1	Mobile home	B	66	66	68	68	2
H1-2[b]	Mobile home (second-row)	B	66	64	66	66	2
H2	Mobile home	B	66	65	66	66	1
H2-2[b]	Mobile home (second-row)	B	66	64	65	65	1
H3	Mobile home	B	66	66	67	67	1
H4	Mobile home	B	66	66	67	67	1
H4-2[b]	Mobile home (second-row)	B	66	64	65	65	1
H5	Jin's Buffet Chinese Restaurant	E	71	65	66	66	1
H6	Dairy Queen Restaurant	E	71	63	64	64	1
H7	Subway Restaurant	E	71	62	63	63	1
H8	Magic Diamond Casino/bar	E	71	67	68	68	1
H9	Burger King Restaurant	E	71	66	67	68	2
H10	Western Security Bank	E	71	64	66	66	2
H11	First Security Bank	E	71	63	65	65	2
H12[c]	Lockwood Dental office (interior)	D	51[c]	44	45	46	2
H13[c]	Jenkins Chiropractor (interior)	D	51[c]	43	44	45	2
H14	Oscars Casino/bar	E	71	62	64	64	2
H15[c]	Holistic Releaf by Design (interior)	D	51[c]	41	43	44	3
H16	Yellowstone Coffee & Canvas	E	71	62	63	63	1
H17	Single-family residence	B	66	64	65	65	1
H18	Single-family residence	B	66	64	65	65	1
H19	Single-family residence	B	66	62	63	63	1
H20	Single-family residence	B	66	62	64	64	2
H21	Single-family residence	B	66	60	61	61	1
H22	Single-family residence	B	66	59	60	60	1

Table 5-1: Predicted Traffic Noise Levels

Receptor Number (Figures 2–3)	Description	Land Use Category (Table 3-1)	Impact Criteria[a] (Table 3-1)	No Build Alternative Present Year 2019 L_{eq}(h) (dBA)	No Build Alternative Design Year 2042 L_{eq}(h) (dBA)	Build Alternative Design Year 2042 L_{eq}(h) (dBA)	Build Alt Design Year minus No Build Alt Present Year[a]
H23	Jackrabbit Red's Casino/bar	E	71	67	68	68	1
H24	Sandees Restaurant	E	71	63	64	64	1
C1	Holiday Inn Express Hotel	E	71	66	68	68	2
B1	Single-family residence	B	66	62	64	62	0
B2	Single-family residence	B	66	62	63	62	0
B3	Single-family residence	B	66	62	63	63	1
B4	Single-family residence	B	66	61	62	62	1
B5	Single-family residence	B	66	63	64	64	1
B6	Single-family residence	B	66	62	64	64	2
B7	Single-family residence	B	66	63	64	64	1
B8	Single-family residence	B	66	60	61	61	1
B9	Single-family residence	B	66	62	63	63	1
B10	Single-family residence	B	66	58	60	60	2

Notes:

[a] MDT defines "approach" as 1 dBA less than NAC value (**Table 3-1**) and "substantially exceed" as at least 13 dBA greater than Present Year noise level (**Section 3.0**).

[b] Represents a second-row receptor evaluated for noise mitigation (**Section 6.0**).

[c] Due to no identified areas of outdoor use, the interior NAC was evaluated (**Section 3.0**).

[d] Receptor planned to be relocated for this Project.

[e] Receptor planned to be relocated for the Segment 5 BBP-Johnson Lane Railroad Overpass project (MDT 2014b).

[f] Receptor predicted to be noise-impacted by the Segment 5 BBP-Johnson Lane Railroad Overpass project (BSA 2012).

NC The L_{eq}(h) could not be calculated by the TNM noise model due to the location of the alignment overlapping the receptor.

Relocate Receptor planned to be relocated for this Project due to the proposed alignment and/or ROW.

Shading Indicates that the predicted traffic noise level meets or exceeds the traffic noise impact criteria (**Section 3.0**).

Figure 2 shows the noise-sensitive receptors identified north of I-90. BSA used the same numbering system for these receptors identified in the original BBP *Traffic Noise Impact Assessment* (BSA 2012) and used in the Final BBP EIS (MDT 2014a). (Note that mobile home Receptor J4 has been relocated since 2014, and was not used for this Project.) The Firth Street neighborhood, which includes single-family residences, mobile home residences and industrial business uses, will be bisected by the new North Frontage Road alignment. Subsequently, five residences (Receptors J2, J3, J10, J11 and J13) are currently planned to be relocated for this Project, and four of these relocated residences are also predicted to be noise-impacted (**Table 5-1**). However, the highest Build Alternative Design Year traffic noise level (L_{eq}(h) 69 dBA) is predicted for remaining Receptor J1, located adjacent to the southeast corner of the new North Frontage Road/Johnson Lane intersection (**Figure 2**). Based on the proposed alignment, this receptor may also need to be relocated due to right-of-way (ROW) and/or property access issues.

Future modifications to the Johnson Lane/Coulson Road intersection are planned for the Segment 5 BBP-Johnson Lane Interchange-Railroad Overpass project (DOWL 2021b, MDT 2021). As shown on **Figure 2** and in **Table 5-1**, Receptors J6 and J7 are planned to be relocated for the Segment 5 project, and four out of five remaining residences (Receptors J1, J8, J9 and J12) are predicted to be noise-impacted by the Segment 5 Preferred Alternative (i.e., Mary Street Option 2) (BSA 2012, MDT 2014a, MDT 2014b). Therefore, cumulatively 11 of the 12 existing residences located in this area, adjacent to Johnson Lane, Firth Street and/or Coulson Road

(i.e., Receptors J1– J3 and J6–J13), are predicted to be noise-impacted and/or will be relocated by the BBP Segment 4 and/or Segment 5 projects (**Figure 2**).

Figure 3 shows the noise-sensitive receptors located south of I-90. Restaurant/bar businesses and a mobile home park are located adjacent to Old Hardin Road and west of the intersection with Johnson Lane. BSA evaluated both first-row and second-row receptors in the mobile home park located on Rykken Circle at the end of the project limits. As identified in **Table 5-1**, three residences (Receptors H1, H3 and H4) are noise-impacted, and currently experiencing high traffic noise levels (No Build Alternative-Present Year). Traffic noise impacts are also predicted for these same residences plus an additional two mobile homes (Receptors H1-2 and H2) for the No Build and Build Alternatives in the Design Year (2042).

As shown on **Figure 3** and in **Table 5-1**, receptors located east of the Old Hardin Road/Johnson Lane intersection include restaurants/bars, bank offices, medical facilities, a hotel, and single-family residences, located adjacent to Old Hardin Road, Cole Street, and/or Becraft Lane. No traffic noise impacts were predicted for these receptors.

5.2 Construction Noise

Road construction causes localized, intermittent, short-duration noise impacts, which may cause annoyance to people living in the area. Construction noise will vary by construction phase, types of equipment used, and distance between activities and a listener location. During construction of the BBP-Johnson Lane Interchange project, the contractor should comply with all Federal, State, County and City applicable regulations governing equipment source levels. The contractor should consider using the following techniques to reduce construction noise impacts at the identified receptors:

1. Place stationary noise sources away from noise-sensitive receptors, including residences.
2. Use portable noise barriers or use natural terrain to provide shielding between equipment and receptors.
3. Turn idling equipment off.
4. Drive equipment forward instead of backward; lift instead of drag materials; and avoid scraping or banging activities.
5. Confine work to between the hours of 7:00 a.m. to 7:00 p.m.
6. Use quieter equipment with properly sized and maintained mufflers, engine intake silencers, less obtrusive backup alarms (such as manually adjustable, self-adjusting or broadband alarms, instead of traditional “beep-beep-beep” alarms), engine enclosures, noise blankets, rubber truck bed linings, etc.

6.0 MITIGATION CONSIDERATIONS

When traffic noise impacts are predicted, possible abatement measures for the mitigation of traffic noise needs to be considered, and the measures are assessed to determine if they are feasible and reasonable (MDT 2017). Possible abatement measures may include construction of noise barriers, modifying the proposed build alternatives, acquisition of real property, traffic management measures, or building modifications for Activity Category D public use or institutional structures. Barriers typically provide the highest level of noise reduction of these mitigation measures.

According to MDT's Noise Policy, to determine if a mitigation measure is feasible, the measure must provide a minimum 5-dBA reduction in noise levels for at least three first-row impacted receptors, and must not cause safety hazards or maintenance, utility or access limitations. To determine if a mitigation measure is reasonable involves an examination of costs, public support, and whether a noise reduction design goal of 7 dBA can be achieved for 60% of the first-row benefited receptors (MDT 2017).

6.1 Noise Barriers

A barrier is most effective when it is continuous and solid, and it blocks the direct line-of-sight between the road and a receptor. Barriers can be constructed using built up dirt to create a berm, using concrete, concrete block, other similar masonry materials, metal panels, or thick wood to create a wall, or a combination of a berm or Jersey barrier with a shorter wall on top. An earthen berm typically has a very large base for support and may also require additional ROW to accommodate construction. To be effective, the barrier wall must be continuous and solid with no gaps, holes or openings in it, including between the bottom edge of the barrier wall and the ground surface (MDT 2017).

As shown on **Figures 2 and 3** and in **Table 5-1**, the predicted noise-impacted receptors that are not currently planned to be relocated for the Project include Receptor J1, located southeast of the new Johnson Lane/North Frontage Road intersection, and the mobile home park (Receptors H1, H1-2, H2, H3 and H4) located south of Old Hardin Road at Rykken Circle. Because the other Firth Street noise-impacted receptors located adjacent to Receptor J1 are planned to be relocated for this Project, a barrier is not feasible for one isolated receptor (J1) (**Section 6.0**). However, the five noise-impacted Rykken Circle mobile home receptors are grouped together, and a barrier is feasible per MDT's Noise Policy (MDT 2017).

MDT uses a Cost-Effectiveness Index (CEI) to determine if a barrier is reasonable. The CEI takes into consideration the noise reduction the barrier will provide and the number of benefited receptors. The CEI is calculated for each barrier configuration. MDT currently uses a planning cost \$40/ft^2 for noise barriers, which includes wall and foundation construction. A CEI that exceeds \$5,600 is not considered reasonable (MDT 2017). Barriers are more likely to be cost-effective for areas with a high density of receptors.

BSA evaluated the reasonableness for a barrier for the mobile home park first-row and second-row residences located adjacent to Old Hardin Road along Rykken Circle as shown on **Figure 3**. For access, a barrier would not be continuous at the Old Hardin Road/Rykken Circle intersections, which reduces the barrier effectiveness. The CEI results for four different height barriers are summarized in **Table 6-1** on the next page. As shown, an 8- to 14-foot-tall barrier wall would not

meet a noise reduction design goal of 7 dBA for 60% of the first-row benefited receptors (**Section 6.0**), and the CEI values are above MDT's $5,600 reasonableness criteria. Therefore, barriers are not reasonable for traffic noise mitigation for the Build Alternative.

Table 6-1: Summary of Estimated CEI Values

Receptors (Figure 3)	Barrier Location	Barrier Length	Barrier Height (feet)	Number of Benefited Receptors	Average Noise Reduction for Benefited Receptors (dBA)	Estimated CEI
H1, H2, H3, H4, H1-2, H2-2, H4-2	On ROW south of Old Hardin Road, adjacent to the mobile home park, with an opening an at Rykken Circle	440 feet	8	0	NA	NA
			10	4	5.8	$7,619
			12	4	6.3	$8,348
			14	4	6.7	$9,226

6.2 Design Modifications

Shifting the horizontal and/or vertical alignments of the Build Alternative to reduce traffic noise impacts can provide more distance between a road and a receptor, resulting in lower noise levels. Many alignment alternatives have been evaluated by the Design Team, and only the preferred alignments were evaluated for this noise analysis (DOWL 2021a, 2021b). As shown on **Figure 2**, in order to eliminate the noise-impact at Receptor J1, the Johnson Lane alignment north of I-90 would need to shift 150 feet west, which may alter the geometry of the Diverging Diamond interchange, create a noise-impact at Receptor J5, and/or alter the future alignment of the Johnson Lane/Coulson Road intersection to be constructed as part of the BBP Segment 5 project (DOWL 2021b, MDT 2021). Therefore, shifting the Johnson Lane alignment is not feasible. As shown on **Figure 3**, mobile home park at Rykken Circle is located at the west end of the project limits on Old Hardin Road. Therefore, moving the alignment of Old Hardin Road north is not feasible when realigning to the existing configuration.

6.3 Acquisition of Real Property

Acquisition of Real Property or interests therein (predominantly unimproved property) is evaluated as a noise mitigation measure to serve as a buffer zone to preempt development that would be adversely impacted by traffic noise (MDT 2017). Referring to **Figure 1**, for future developments additional ROW could be acquired in various undeveloped areas within the project limits to reduce traffic noise impacts, based on the setback distances shown in **Section 7.0**, **Table 7-1**.

Also, as shown on **Figure 2** and in **Table 5-1**, MDT is currently planning to relocate five Firth Street neighborhood homes for the east leg of North Frontage Road, which eliminates noise-impacts at four receptors (i.e., J2, J10, J11 and J13). However, the highest Project noise level is predicted for Receptor J1, located directly southeast of the Johnson Lane/North Frontage Road intersection, and MDT may want to consider relocating this mobile home due to ROW and/or property access issues.

6.4 Traffic Management Measures

Traffic management measures include traffic control devices, signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modifying speed limits, and exclusive lane designations (MDT 2017). Traffic control devices are already included in the Project design (DOWL 2021a). Signalized intersections are designed at the Johnson Lane/North Frontage Road intersection, within the Diverging Diamond Johnson Lane Interchange, and at the Johnson Lane/Old Hardin Road and Old Hardin Road/Cole Street intersections. Stop-controlled intersections are also planned for Sannon Boulevard at North Frontage Road and Coulson Road.

Due to the heavy industrial and truck uses in the project limits, restricting certain vehicle types, limiting the time of day that certain vehicles may use the roads, or exclusive lane designations are not reasonable mitigation measures for the connectivity of the BBP and the functionality of the Project. Modifying speed limits is a potential noise mitigation measure if it does not hinder the function of the roadways, and the current posted speed limits are listed in **Table 4-4**. However, speed limits are generally set by the Transportation Commission, and are usually reduced for safety concerns rather than noise impacts (MDT 2017), and therefore, were not evaluated.

7.0 COORDINATION WITH LOCAL OFFICIALS

Traffic noise can significantly affect the value and usefulness of property near highways. Traffic noise at future areas of frequent residential outdoor use can be annoying, distracting and hinder communication. In March 2008, MDT published *Growing Neighborhoods in Growing Corridors: Land Use Planning for Traffic Noise*, and recommended that traffic noise levels of $L_{eq}(h)$ 60 dBA be used to determine the location of outdoor use areas and the location of residential building façades closest to the road, and to avoid traffic noise problems in the future (MDT 2008). For comparison, 60 dBA represents the typical exterior background noise levels of a large urban area and the background noise levels inside large busy offices. If the 60 dBA criteria can be met by planning a site accordingly, then the need for traffic noise control measures, such as barrier walls, earthen berms, improved window configurations, etc., can be avoided.

Although, no new subdivisions or developments are currently planned or proposed within the project limits (Yellowstone County 2021), to avoid traffic noise impacts at future developments (**Figure 1**) BSA determined the minimum setback distances from the Build Alternative centerlines to where the Design Year $L_{eq}(h)$ 60 and 64 dBA noise levels are predicted to occur (MDT 2008). **Table 7-1** lists the setback distances for the modeled 60 and 64 dBA contour lines.

Table 7-1: Traffic Noise Level vs. Minimum Setback Distances from the Build Alternative Centerlines

Road	60 dBA Contour Line	64 dBA Contour Line
Johnson Lane – North of I-90	310 ft	170 ft
Johnson Lane – North of North Frontage Road	90 ft	< 50 ft
North Frontage Road – East	70 ft	< 50 ft
North Frontage Road – West	250 ft	170 ft
Sannon Boulevard	< 50 ft	< 50 ft
I-90 & On/Off Ramps	450 ft	300 ft
Old Hardin Road – East	110 ft	50 ft
Cole Street/Becraft Lane – East	75 ft	< 50 ft

Local officials should strongly encourage developers to incorporate noise-compatible development on their planned/proposed properties. Examples of noise-compatible development include providing greenbelts, open space, or parkland between the residents and the highway. Garages, carports or storage sheds should front the road rather than residences. If residential buildings must be located along the highway, the homes should be designed so that less-sensitive rooms, such as kitchens, laundry rooms, utility rooms, and storage spaces face the road rather than bedrooms or living rooms. Windows in the road-side of the building should be avoided. Strategies that incorporate noise-compatible development concepts are proactive and preventative in nature and can avoid traffic noise impact problems in the future.

8.0 CONCLUSION

BSA evaluated traffic noise level impacts for both the No Build and Build Alternatives for this Segment 4 BBP-Johnson Lane Interchange Project (**Figure 1**). BSA completed six noise level measurements in July 2021 to determine the existing ambient noise levels within the project limits (**Section 4.1**), and to verify that the TNM computer models used to predict the traffic noise levels were reasonably accurate (**Section 4.2**).

Noise-sensitive receptors were identified within approximately 500 feet of the edge of the closest travel lane using aerial photographs and BSA's fieldwork observations in July 2021. A total of 51 noise-sensitive receptors are depicted on **Figures 2 and 3**. As categorized in **Table 3-1**, the receptors evaluated include 35 single-family and mobile home residences (Activity Category B), three medical offices (Activity Category D), one hotel, two offices, and 10 restaurants/bars (Activity Category E).

The TNM-predicted traffic noise levels for both the No Build and Build Alternatives are summarized in **Table 5-1**. For the noise-sensitive receptors located adjacent to the Project roads, three traffic noise impacts are predicted due to the No Build Alternative in the Present Year (2019) and six impacts in the Design Year (2042). For the Build Alternative, 10 traffic noise impacts are predicted in the Design Year.

Figure 2 shows the noise-sensitive receptors identified north of I-90. The Firth Street neighborhood, which includes single-family residences, mobile home residences and industrial business uses, will be bisected by the new North Frontage Road alignment. Subsequently, five residences (Receptors J2, J3, J10, J11 and J13) are currently planned to be relocated for this Project, and four of these relocated residences are also predicted to be noise-impacted (**Table 5-1**). However, the highest Build Alternative Design Year traffic noise level (L_{eq}(h) 69 dBA) is predicted for remaining Receptor J1, located adjacent to the southeast corner of the new North Frontage Road/Johnson Lane intersection (**Figure 2**). Based on the proposed alignment, this receptor may also need to be relocated due to right-of-way (ROW) and/or property access issues.

Future modifications to the Johnson Lane/Coulson Road intersection are planned for the Segment 5 BBP-Johnson Lane Interchange-Railroad Overpass project (DOWL 2021b, MDT 2021). As shown on **Figure 2** and in **Table 5-1**, Receptors J6 and J7 are planned to be relocated for the Segment 5 project, and four out of five remaining residences (Receptors J1, J8, J9 and J12) are predicted to be noise-impacted by the Segment 5 Preferred Alternative (i.e., Mary Street Option 2) (BSA 2012, MDT 2014a, MDT 2014b). Therefore, cumulatively 11 of the 12 existing residences located in this area adjacent to Johnson Lane, Firth Street and/or Coulson Road

(i.e., Receptors J1– J3 and J6–J13) are predicted to be noise-impacted and/or will be relocated by the BBP Segment 4 and/or Segment 5 projects (Figure 2).

Figure 3 shows the noise-sensitive receptors located south of I-90. Restaurant/bar businesses and a mobile home park are located adjacent to Old Hardin Road and west of the intersection with Johnson Lane. As identified in **Table 5-1**, three residences (Receptors H1, H3 and H4) are noise-impacted, and currently experiencing high traffic noise levels (No Build Alternative-Present Year). Traffic noise impacts are also predicted for these same residences plus an additional two mobile homes (Receptors H1-2 and H2) for the No Build and Build Alternatives in the Design Year. No traffic noise impacts were predicted for receptors located east of the Old Hardin Road/Johnson Lane intersection.

Because traffic noise impacts were predicted, BSA evaluated traffic noise mitigation measures and determined if the measures are reasonable or feasible (**Section 6.0**), including the construction of noise barriers, modifying the proposed build alternatives, acquisition of real property, and traffic management measures. Five Firth Street noise-impacted receptors located adjacent to Receptor J1 are currently planned to be relocated for this Project (**Figure 2**), and therefore, a barrier is not feasible for one receptor (J1). BSA evaluated the reasonableness for a barrier for the mobile home park located adjacent to Old Hardin Road along Rykken Circle (**Figure 3**). The CEI results are summarized in **Table 6-1**, however, a barrier wall would not meet MDT's noise reduction design goal, and the CEI values are above MDT's reasonableness criteria. Therefore, barriers are not reasonable for traffic noise mitigation of the Build Alternative.

Shifting the horizontal and/or vertical alignments of the Build Alternative to reduce traffic noise impacts can provide more distance between a road and a receptor, resulting in lower noise levels. Many alignment alternatives have been evaluated by the Design Team, and only the preferred alignments were evaluated for this noise analysis. In order to eliminate the noise-impact at Receptor J1 (**Figure 2**), the Johnson Lane alignment north of I-90 would need to shift 150 feet west, which is not feasible. Additionally, the mobile home park at Old Hardin Road and Rykken Circle (**Figure 3**) is located at the west end of the project limits, and moving the alignment north is not feasible when realigning to the existing configuration.

The acquisition of Real Property or interests therein (predominantly unimproved property) is evaluated as a noise mitigation measure to serve as a buffer zone to preempt development that would be adversely impacted by traffic noise (MDT 2017). For the existing properties, the highest Project noise level is predicted for Receptor J1, and MDT may want to consider relocating this mobile home due to ROW and/or property access issues (**Figure 2** and **Table 5-1**).

Traffic management measures include traffic control devices, signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modifying speed limits, and exclusive lane designations (MDT 2017). Traffic control devices are already included in the Project design (DOWL 2021a). Due to the heavy industrial and truck uses in the project limits, restricting certain vehicle types, limiting the time of day that certain vehicles may use the roads, or exclusive lane designations are not reasonable mitigation measures for the connectivity of the BBP and the functionality of the Project. Speed limits are generally set by the Transportation Commission, and are usually reduced for safety concerns rather than noise impacts (MDT 2017).

To avoid future traffic noise impacts in Activity Category G undeveloped lands, BSA determined the minimum setback distances from the nearest Build Alternative centerline to where the Design Year $L_{eq}(h)$ 60 and 64 dBA noise levels are predicted to occur (**Table 7-1**). Local officials should strongly encourage developers to incorporate noise-compatible planning measures to avoid traffic noise problems in the future (MDT 2008).

9.0 REFERENCES

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10.0 STANDARD OF CARE

To complete this report, BSA has endeavored to perform its services consistent with the professional skill and care ordinarily provided by acoustical consultants practicing in similar markets and under similar project conditions. BSA is fully experienced and properly qualified to perform acoustical consulting services. However, BSA makes no warranty, either expressed or implied, as to the professional services it has rendered to complete this report. For the completion of this report, BSA has used data provided by DOWL, Inc. and MDT in performing its services and is entitled to rely upon the accuracy and completeness thereof. Therefore, if the information and assumptions used to create this report change (i.e., traffic data, location of the travel lanes, modification of the Build Alternative alignments, etc.) then the noise analysis and the recommended noise control measures will need to be reevaluated.

FIGURE 1

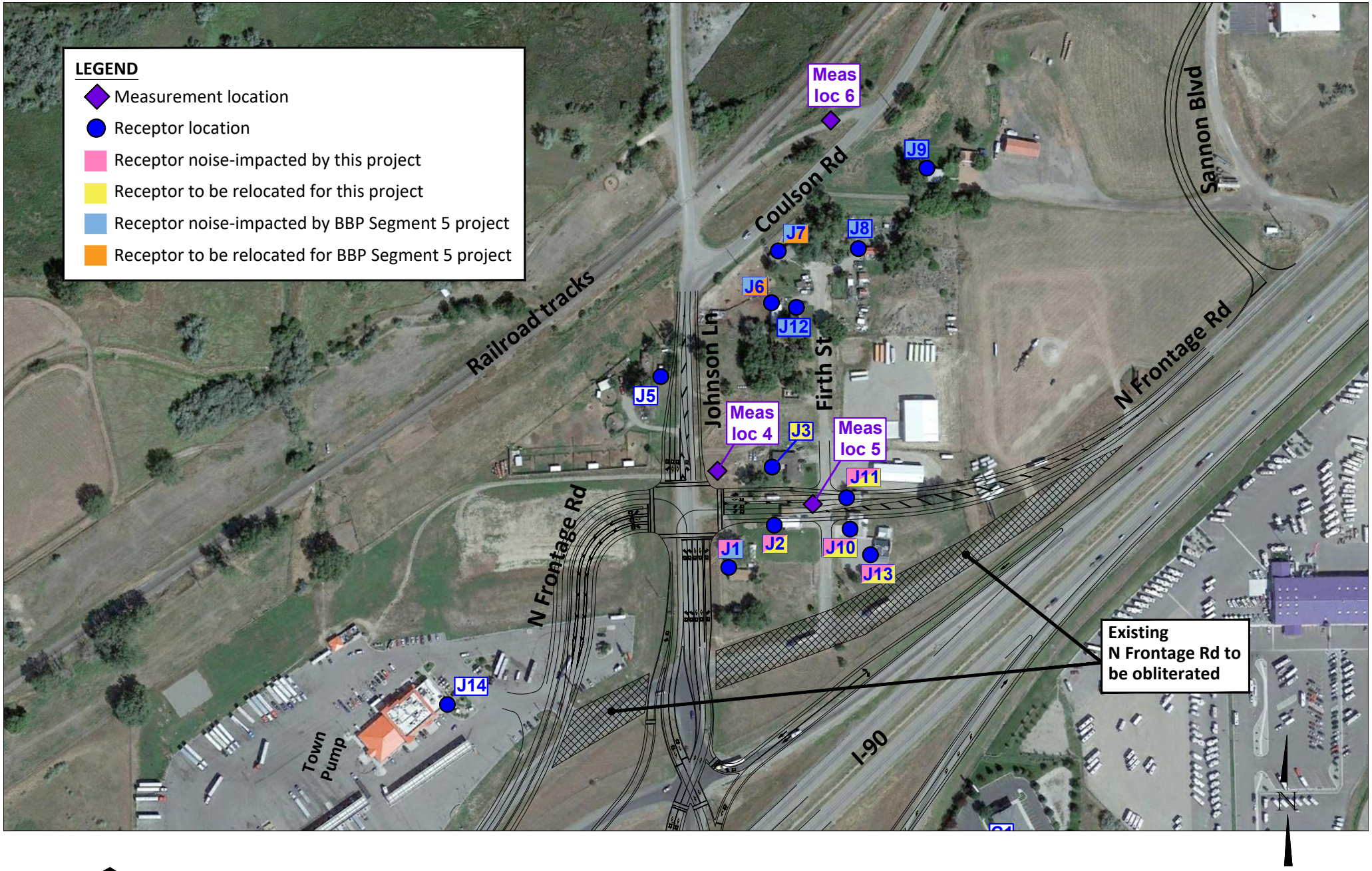
Big Sky Acoustics

Project Overview

Billings Bypass - Johnson Lane Interchange

NCPD-MT 56(55), UPN 4199007

Not-to-scale



Big Sky Acoustics

FIGURE 2

Receptor and Measurement Locations: North of I-90

Billings Bypass - Johnson Lane Interchange

NCPD-MT 56(55), UPN 4199007

Scale: 1" = 300 ft (8.5 x 11)

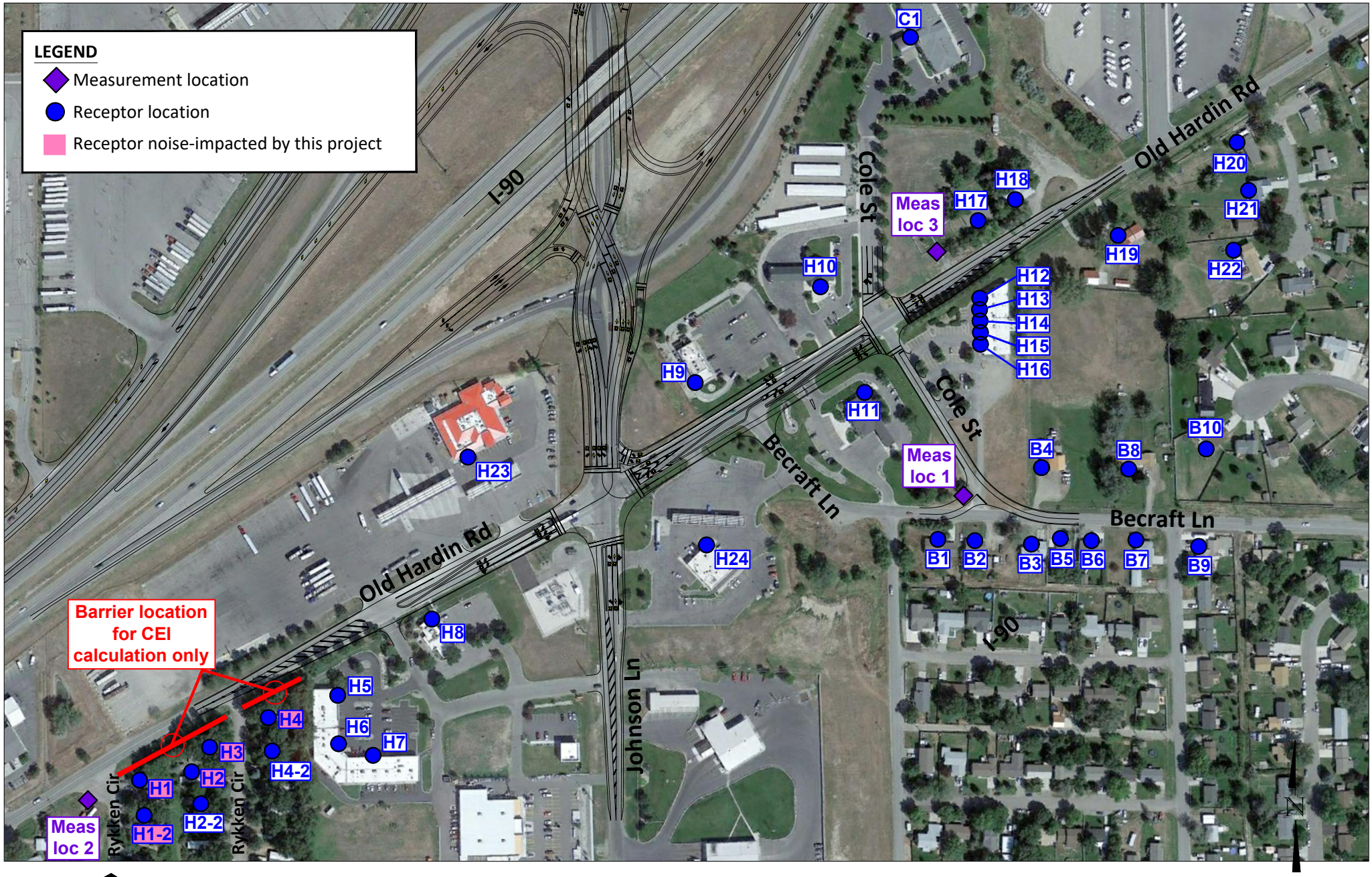


FIGURE 3

Big Sky Acoustics

Receptor and Measurement Locations: South of I-90

Billings Bypass - Johnson Lane Interchange

NCPD-MT 56(55), UPN 4199007

Scale: 1" = 300 ft (8.5 x 11)

Attachment 4: Johnson Lane Interchange SHPO Concurrences

Big Sky. Big Land. Big History.
Montana Historical Society

Historic Preservation
Museum
Outreach & Interpretation
Publications
Research Center

December 27, 2021

Jon Axline, Historian
Montana Department of Transportation
2701 Prospect Avenue
P.O. Box 201001
Helena, MT 59620-1001

Re: Billings Bypass – Johnson Lane Interchange

Dear Mr. Axline,

Thank you for the letter and associated materials, received December 22, 2021, regarding the Billings Bypass – Johnson Lane Interchange project in Yellowstone County, Montana. We concur with the following eligibility determinations:

- 24YL0271 – Ineligible
- 24YL0272 – Ineligible
- 24YL0641 – Ineligible
- 24YL1874 – Ineligible

Additionally, we noticed on your map of the survey area that there are several other sites (especially 24YL1871, 24LY1872, and 24YL1873) in very close proximity to your project area. We recommend that you take these sites into consideration when assessing effect.

Please note that our concurrence does not substitute for a good faith effort to consult with interested parties, local government authorities, and American Indian tribes. If you receive a comment that substantially relates to a historic property located within or adjacent to the Area of Potential Effect, please submit it to our office for review, including documentation of how the comment was addressed.

If you have any questions or concerns, do not hesitate to contact me at Laura.Marsh@mt.gov. Thank you for consulting with us.

Sincerely,

Laura Marsh, M.A.
Compliance Officer
Montana State Historic Preservation Office

225 North Roberts Street
P.O. Box 201201
Helena, MT 59620-1201
(406) 444-2694
(406) 444-2696 FAX
montanahistoricalsociety.org

File: MDT – 2021 - 2021122205

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Outreach & Interpretation
Publications
Research Center

27 December 2021

Mr. Jon Axline
Historian
Environmental Services
Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Ref: IM-CMBL-STPU-NCPD-NHPB 56(53)
Billings Bypass – Johnson Lane Interchange
UPN 4199007

Dear Mr. Axline,

Thank you for consulting with the Montana State Historic Preservation Office (SHPO) regarding the Billings Bypass – Johnson Lane Interchange project. After a review of your consultation package, SHPO continues to concur that 24YL1871, 24YL1872, and 24YL1873 are *not eligible* for listing in the National Register of Historic Places. Thank you for providing site update forms for those properties.

In addition, SHPO concurs with your finding that 24YL2304, 24YL2305, 24YL2306, 24YL2307, and 24YL2308 are *not eligible* for listing in the National Register of Historic Places.

Thank you for providing the necessary information to complete this review. Please feel free to contact me if you have any questions or if I can be of any further assistance. I can be reached at 406.444.7717 or at eric.newcombe@mt.gov.

Sincerely,

Eric Newcombe

Eric Newcombe, M.A.
Historic Architecture Specialist
State Historic Preservation Office
Montana Historical Society
P.O. Box 201202/1301 E. Lockey Avenue
Helena, MT 59602
Eric.Newcombe@mt.gov
(406) 444-7717

File ID: MDOT-2021-2021122207

Attachment 5: Johnson Lane Interchange Subsurface Investigation Report

Billings Bypass Subsurface Investigation Report

Montana Department of Transportation Billings Bypass Project I-90 / Johnson Lane Interchange

NCPD-MT 56(55): UPN 41990007

Billings, MT 59101

Prepared for:

Montana Department of Transportation

2701 Prospect Avenue

P.O. Box 201001

Helena, MT 59620

Prepared by:

West Central Environmental Consultants, Inc.

455 Moore Lane, #2

Billings, MT 59101

January 26, 2021

WCEC Project No. 20-13262-70

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FIGURES

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APPENDICES

1.0 Introduction

On behalf of DOWL, West Central Environmental Consultants, Inc. (WCEC) has prepared this subsurface investigation report for the future reconstruction of the Billings Bypass Project – Interstate 90 / Johnson Lane Interchange in Billings, Montana. DOWL contracted WCEC to perform a subsurface investigation identified in the Montana Department of Transportation's (MDT) right-of-way (ROW) near three underground storage tank (UST) / retail fueling facilities. MDT identified these locations where subsurface investigation was warranted. WCEC completed a subsurface investigation and collected soil samples at the identified locations along the project boundary. Soil samples from each boring location, for a total of 20 samples, were collected for laboratory analysis. Soil borings were pushed to 15 feet below ground surface (bgs), and groundwater samples were to be collected from each boring where groundwater was encountered. Groundwater was not encountered before 15 feet bgs in any of the boring locations during the subsurface investigation. The soil profiles were field-screened using a calibrated photoionization detector (PID) and visual/olfactory evidence, and soil samples were collected to determine if potentially impacted soils would be encountered during future MDT construction activities along the project boundary.

1.1 Site Location

The project area consists of three previously identified areas along MDT's ROW. Site location maps are presented as Figure 1. The identified facilities, addresses, and number of associated borings include:

- Town Pump Pilot Truck Stop (2711 North Frontage Road) – 6 borings to the south and east of the site.
- Town Pump Flying J Truck Stop (2775 Old Hardin Road) – 10 borings to the north, east, and south of the site.
- Casey's Corner Store (2816 Old Hardin Road) – 4 borings to the north and west of the site.

The Public Land Survey System (PLSS) description for the project area is Sections 19 and 30, Township 1 North, Range 27 East. The approximate geographic coordinates of each boring are listed in the boring logs presented in Appendix A. Township, range, and section information was obtained using the United States Department of Agriculture, Billings, Montana 1:12,000 Quadrangle [Figure 1]. Elevation of the project area ranges from approximately 3,100 to 3,140 feet above mean sea level. Photographs taken during the investigation are presented in Appendix B.

1.2 Hydrogeologic Setting

The project area lies approximately 4,000 feet southeast of the Yellowstone River. Subsurface lithology consists primarily of alluvium gravel from the Pleistocene era with underlying terraces about 20 to 40 feet above present elevation of the Yellowstone River (Gosling and Pashley, 1973). The underlying terraces consist of mostly cobbles and pebbles with minor amounts of sand and silt. Clasts are mainly granitic igneous rocks, granitic gneiss, schist, and quartzite, with much less limestone and sandstone approximately 40 to 60 feet thick (Gosling and Pashley, 1973). Terrace deposits, part of the Fort Union Formation, can range to 1,000 feet thick in certain places. The alluvium consists of unconsolidated clay, sand, and gravel [Vuke et al, 2001]. The depth to groundwater varies seasonally from approximately 6 to 15 feet bgs depending on the surface elevation of the Yellowstone River [MBMG, 2020]. The groundwater flow direction is to the northwest towards the Yellowstone River.

1.3 Scope of Work

The objective of the investigation is to evaluate whether subsurface soils and groundwater in MDT's ROW have been impacted by petroleum hydrocarbons, adjacent to the previously identified sites in the project area. This will enable MDT to develop a management plan for contaminated soils and groundwater, if encountered during future construction activities. The subsurface investigation included the following task elements:

- Develop and implement a project health and safety plan and maintain safe work conditions for project personnel at all times.

- Locate underground utilities, obtain an MDT encroachment permit, and provide traffic control for field activities.

- Conduct a subsurface investigation using direct push technology to a depth of approximately 15 feet bgs in the project area to collect soil and any encountered groundwater samples at each boring. Visually log and field screen soil using a calibrated PID.

- Collect soil and groundwater grab samples from each boring. Submit samples under standard chain-of-custody (COC) protocol to Energy Laboratories (Energy) according to standard Montana Department of Environmental Quality (MTDEQ) protocols for petroleum release investigations for extractable petroleum hydrocarbon (EPH) Screen and volatile petroleum hydrocarbon (VPH) analysis.

- Characterize and dispose of any investigation-derived wastes.

- Upon receipt of the analytical results, prepare a draft summary report of findings, including site maps with sampling locations, areas of subsurface contamination, a summary of subsurface conditions, and a summary table of laboratory analytical results. The report will also include appropriate appendices including laboratory reports, bore logs, and a photographic log.

2.0 Subsurface Soil Investigation

2.1 Subsurface Soil Investigation Overview

WCEC directed and supervised a subsurface soil investigation between December 9 and December 11, 2020, at the project area. Prior to initiation of field activities, WCEC coordinated an underground utility locate which encompassed the entire project boundary in the MDT ROW of Interstate 90, Johnson Lane, North Frontage Road, and Old Hardin Road. WCEC personnel mobilized to the site, conducted a brief site walkover, in which underground utilities present in the investigation area were discussed and identified. WCEC conducted a site safety meeting to discuss potential issues with the site.

The soil investigation commenced on the morning of December 9, 2020. A Geoprobe model 7822 direct push technology (DPT) drill rig was used to advance the soil borings during the investigation. Soil borings were completed at 20 distinct horizontal locations in the previously identified areas. Soil boring sample locations are summarized in Table 1 and are displayed graphically on Figure 2.

WCEC personnel continuously field screened soils using a Rae Systems MiniRae™ 3000 PID using a heated headspace method, as well as visual and olfactory evidence to determine which horizons may be impacted. The PID was calibrated daily using fresh air and span gas calibration points. Isobutylene span gas at a concentration of 100 parts per million (ppm) was used in the calibration procedure. Soil samples were collected and handled according to WCEC standard operating procedures (SOPs) and in accordance with the MTDEQ requirements.

The soil samples were placed in method-specific, laboratory-provided containers, preserved if necessary, and packed on ice for shipment under COC protocol to Energy in Billings, Montana. Energy was instructed to analyze the samples for VPH and EPH Screen. If the EPH screen exceeded 200 milligrams per kilogram (mg/kg), the sample was also analyzed for total extractable hydrocarbons (TEH) fractions.

WCEC surveyed the soil sample locations using a Trimble Geo 7x centimeter-grade GPS. The raw GPS data was post-processed through Trimble Pathfinder Office software. Horizontal coordinates were exported to

the North American Datum of 1983 Montana State Plane Coordinate System in units of United States Survey Feet. Vertical coordinates were exported to the North American Vertical Datum of 1988 in units of United States Survey Feet.

2.2 Subsurface Soil Investigation Results

A total of 20 soil samples were collected during the subsurface investigation and submitted to Energy for analysis. The results from the soil samples are listed in Table 2. The following sections summarize the results from the soil boring samples for each analytical method. The soil results were compared to the applicable MTDEQ Risk-Based Screening Levels (RBSLs) [MTDEQ, 2018] to determine regulatory compliance. The complete laboratory analytical data package along with the data validation form are included in Appendix C.

2.2.1 VPH Results

All VPH constituents in the soil samples collected were below the RBSLs for all constituents of concern [Table 2].

2.2.2 EPH Results

All EPH constituents in the soil samples collected were below the RBSLs for all constituents of concern [Table 2].

3.0 Groundwater Investigation

Groundwater samples were to be collected in each boring where groundwater was encountered. All borings were advanced to 15 bgs and no groundwater was encountered in any boring at this depth. To attempt to establish groundwater levels, WCEC advanced the first boring to a depth of 20 bgs, installed a temporary piezometer, and allowed it to collect groundwater overnight. The next day, depth to water was recorded in the piezometer at 17.55 feet bgs. This depth is consistent with historical records from the local area and the low-water season of the nearby Yellowstone River. A field determination was made by MDT to continue advancing the borings to 15 feet bgs and, if groundwater was not encountered, only collect soil samples from each boring.

4.0 Summary & Discussion

4.1 Field Work Summary

WCEC conducted a subsurface soil investigation at the site between December 9 and December 11, 2020. A total of 20 soil samples were obtained from 20 distinct locations in previously identified areas of concern for MDT along the interchange of Interstate 90 and Johnson Lane in Billings, Montana. All collected samples were packed on ice and transported to Energy in Billings, Montana for laboratory analysis.

Groundwater samples were to be collected from each boring if groundwater was encountered. Groundwater was not encountered to 15 bgs in any of the advanced soil borings, hence no groundwater samples were collected during this investigation.

4.2 Discussion of Results

The subsurface soil investigation results indicated that petroleum impacts were not identified at the 20 soil boring locations completed within the investigation areas.

4.3 Conclusions

Based on the cumulative results from the subsurface soil investigation completed in December 2020, WCEC believes that the objectives for the scope of work listed in Section 1.3 of this report have been satisfied. No soil impacts above RBSLs were identified during the investigation. Based on this information, WCEC concludes that further investigation of potential petroleum impacts are not warranted in the areas of subsurface investigation along the project boundary.

5.0 References

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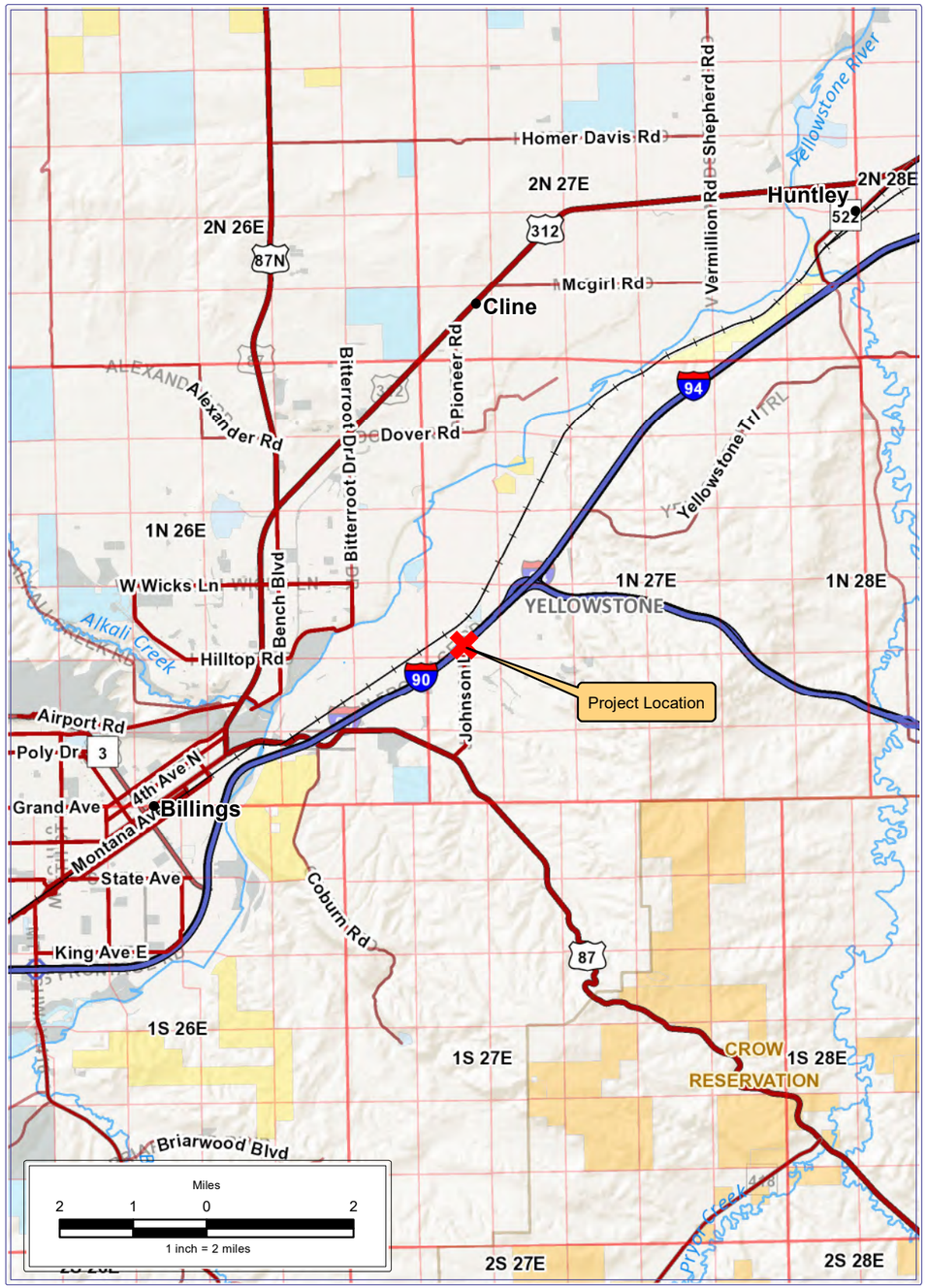

LEGEND

✖ Site Location

N

Site Location Maps

MDT Subsurface Investigation
I-90 Johnson Lane Interchange
Billings, MT 59101

DRAWN BY: MM
DATE: 12/17/20
SCALE: 1:12,000

PROJECT NUMBER: 20-13262-70

IMAGE SOURCE: ESRI BASEMAPS

WCEC
ENVIRONMENTAL CONSULTANTS

FIGURE 1

Soil Borehole

N

300 150 0 1 inch = 300 feet 300

Borehole Locations Map

MDT Subsurface Investigation
I-90 Johnson Lane Interchange
Billings, MT 59101

DRAWN BY: MM
DATE: 12/17/20
SCALE: 1:3,600

PROJECT NUMBER: 20-13262-70
IMAGE SOURCE: ESRI World

WCEC
ENVIRONMENTAL CONSULTANTS

FIGURE 2

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TABLE 1
Soil Boring Sample Locations Summary
Billings Bypass Project I-90 / Johnson Lane Interchange
Billings, Montana

Sample ID	Depth Interval (ft)	Approximate Location	Highest PID (ppm)	Comments
SB1	20	East Side of Town Pump Pilot	0.5	This soil boring was advanced east of Town Pump Pilot and west of Johnson Lane.
SB2	15	East Side of Town Pump Pilot	0.3	This soil boring was advanced east of Town Pump Pilot and west of Johnson Lane.
SB3	15	East Side of Town Pump Pilot	0.1	This soil boring was advanced east of Town Pump Pilot and west of Johnson Lane.
SB4	15	Southwest of Town Pump Pilot	1.3	This soil boring was advanced southwest of Town Pump Pilot near the Frontage Road.
SB5	15	South of Town Pump Pilot	0.2	This soil boring was advanced south of Town Pump Pilot's USTs near the Frontage Road.
SB6	15	South of Town Pump Pilot	0.3	This soil boring was advanced south of Town Pump Pilot's USTs near the Frontage Road.
SB7	15	North of Town Pump Flying J	0.2	This soil boring was advanced north of Town Pump Flying J.
SB8	15	North of Town Pump Flying J	0.3	This soil boring was advanced north of Town Pump Flying J's USTs.
SB9	15	North of Town Pump Flying J	0.2	This soil boring was advanced north of Town Pump Flying J's USTs.
SB10	15	North of Town Pump Flying J	0.1	This soil boring was advanced north of Town Pump Flying J commercial building.
SB11	15	North of Town Pump Flying J	2.1	This soil boring was advanced northeast of Town Pump Flying J commercial building.
SB12	15	East of Town Pump Flying J	0.6	This soil boring was advanced east of Town Pump Flying J parking area.
SB13	15	East of Town Pump Flying J	0.4	This soil boring was advanced east of Town Pump Flying J parking area.
SB14	15	East of Town Pump Flying J	0.5	This soil boring was advanced southeast of Town Pump Flying J parking area.
SB15	15	South of Town Pump Flying J	0.3	This soil boring was advanced south of Town Pump Flying J parking area near Old Hardin Road.
SB16	15	South of Town Pump Flying J	1.1	This soil boring was advanced south of Town Pump Flying J parking area near Old Hardin Road.

Sample ID	Depth Interval (ft)	Approximate Location	Highest PID (ppm)	Comments
SB17	15	North of Casey's	0.2	This soil boring was advanced north of Casey's parking area near Old Hardin Road.
SB18	15	North of Casey's	0.6	This soil boring was advanced north of Casey's parking area near Old Hardin Road.
SB19	15	West of Casey's	0.6	This soil boring was advanced west of Casey's parking area near Johnson Lane.
SB20	15	West of Casey's	0.4	This soil boring was advanced west of Casey's parking area near Johnson Lane.

PID = photoionization detector

ppm = parts per million

TABLE 2

Soil Boring Analytical Results - VPH/EPH
Billings Bypass Project I-90 / Johnson Lane Interchange
Billings, Montana

All values reported in mg/kg

Sample Location	Sample Date	Aromatic VPH Constituents							Aliphatic VPH Constituents			EPH Screen
		MTBE	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Naph-thalene	C9-C10 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	TPH	
SB1	12/09/20	<0.12	<0.061	<0.061	<0.061	<0.061	<0.12	<2.4	<2.4	<2.4	<2.4	12
SB2	12/09/20	<0.12	<0.062	<0.062	<0.062	<0.062	<0.12	<2.5	<2.5	<2.5	<2.5	<12
SB3	12/09/20	<0.11	<0.057	<0.057	<0.057	<0.057	<0.11	<2.3	<2.3	<2.3	<2.3	<11
SB4	12/09/20	<0.11	<0.056	<0.056	<0.056	<0.056	<0.11	<2.2	<2.2	<2.2	<2.2	<11
SB5	12/09/20	<0.12	<0.059	<0.059	<0.059	<0.059	<0.12	<2.4	<2.4	<2.4	<2.4	<12
SB6	12/09/20	<0.12	<0.058	<0.058	<0.058	<0.058	<0.12	<2.3	<2.3	<2.3	<2.3	<12
SB7	12/10/20	<0.11	<0.056	<0.056	<0.056	<0.056	<0.11	<2.2	<2.2	<2.2	<2.2	<11
SB8	12/10/20	<0.11	<0.057	<0.057	<0.057	<0.057	<0.11	<2.3	<2.3	<2.3	<2.3	12
SB9	12/10/20	<0.12	<0.058	<0.058	<0.058	<0.058	<0.12	<2.3	<2.3	<2.3	<2.3	<12
SB10	12/10/20	<0.13	<0.064	<0.064	<0.064	<0.064	<0.13	<2.5	<2.5	<2.5	<2.5	<13
SB11	12/10/20	<0.11	<0.056	<0.056	<0.056	<0.056	<0.11	<2.2	<2.2	<2.2	<2.2	<11
SB12	12/10/20	<0.11	<0.054	<0.054	<0.054	<0.054	<0.11	<2.2	<2.2	<2.2	<2.2	<11
SB13	12/10/20	<0.12	<0.059	<0.059	<0.059	<0.059	<0.12	<2.4	<2.4	<2.4	<2.4	<12
SB14	12/10/20	<0.11	<0.057	<0.057	<0.057	<0.057	<0.11	<2.3	<2.3	<2.3	<2.3	<11
SB15	12/10/20	<0.11	<0.055	<0.055	<0.055	<0.055	<0.11	<2.2	<2.2	<2.2	<2.2	<11
SB16	12/10/20	<0.12	<0.060	<0.060	<0.060	<0.060	<0.12	<2.4	<2.4	<2.4	<2.4	<12
SB17	12/11/20	<0.12	<0.060	<0.060	<0.060	<0.060	<0.12	<2.4	<2.4	<2.4	<2.4	<12
SB18	12/11/20	<0.12	<0.059	<0.059	<0.059	<0.059	<0.12	<2.3	<2.3	<2.3	<2.3	<12
SB19	12/11/20	<0.12	<0.060	<0.060	<0.060	<0.060	<0.12	<2.4	<2.4	<2.4	<2.4	<12
SB20	12/11/20	<0.11	<0.056	<0.056	<0.056	<0.056	<0.11	<2.2	<2.2	<2.2	<2.2	<11
RBSLs[(a)]		0.078	0.07	21	26	320	12	130	220	640	--	--

[(a)] Montana Department of Environmental Quality Risk-Based Screening Levels (RBSLs), commerical soil, <10 ft to groundwater (May 2018)

20-13262-70

VPH = volatile petroleum hydrocarbons

EPH = extractable petroleum hydrocarbons

TPH = total purgeable hydrocarbons

mg/kg = milligrams per kilograms

-- = not analyzed or no RBSL

Appendix A – Boring Logs

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB1**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/9/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**10:20 AM**
DRILLER:	**Liam MacDonald**	-end:	**13:00 PM**
DRILLING METHOD:	**Direct Push**	GPS Location	

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0 - 1ft., Gravel fill material; moist;					
							1 - 3ft., dark brown silty loam; moist; small cobbles <2 cm					
						CL	3 - 5ft., brown to dark brown, silty clay; moist; low plasticity; No HC odor/staining			0.3		
5							Rock push, little recovery. Brown silty clay; moist; low plasticity					
10							Same as above			0.2		
							Δ11-20' light brown to brown silty clay; moist; med plasticity; No HC odor/staining					
15											LS	
									WL			
20							End of Boring @ 20ft.			0.5		
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/9/2020			**WL observed at 17.55 bgs on next day**	**No FP observed**

Comments:

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB2**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/9/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**1:20 PM**
DRILLER:	**Liam MacDonald**	-end:	**1:25 PM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-1.5 ft unconsolidated fill, brown to dark brown, gravel < 2cm					gravel fill
						SP	1.5-13 ft. Light brown, silty loam, moist, low plasticity No HC odor/staining					sandy loam
5							Same as above			0.3		silty loam
10							Same as above			0.1		
						CL	13.5-15ft. Light brown silty clay, medium plasticity, moist, No HC odor/staining				LS	Caly
15							End of Boring @ 15ft.			0.0		
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/9/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (1:30 PM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB3**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/9/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**1:45 PM**
DRILLER:	**Liam MacDonald**	-end:	**2:00 PM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-6in. Unconsolidated fill material, brown/dark brown, cobbles					gravel fill
						SP	6in.-15ft. Sandy loam , light brown, moist No HC, powdery			0.6		sandy loam
5							Same as above			1.1		
10							Same as above			1.3	LS	
15							End of Boring @ 15ft.					
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/9/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (2:00 PM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB4**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/9/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**2:25 PM**
DRILLER:	**Liam MacDonald**	-end:	**2:45 PM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-1ft. Unconsolidated fill material, brown, small pebbles <2cm.					
						SC	1-15ft. silty loam, light brown, moist No HC			1.1		
5							Same as above					
10							Same as above			1.0		
15							End of Boring @ 15ft.			1.3	LS	
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/9/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (2:35 PM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB5**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/9/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**2:50 PM**
DRILLER:	**Liam MacDonald**	-end:	**3:10 PM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-1ft. Asphalt, unconsolidated fill material, greyish brown					
						CL	1-3ft. silty loam, brown, moist, medium plasticity No HC observed					
						ML	3-5ft. Clay loam, brown, moist No HC			0.0		
5						SC	5-15ft. Silty loam, brown, moist No HC					
10							Same as above			0.2		
											LS	
15							End of Boring @ 15ft.			0.1		
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/9/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (3:05 PM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB6**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/9/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**3:15 PM**
DRILLER:	**Liam MacDonald**	-end:	**3:35 PM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-1.5ft. Asphalt, unconsolidated fill material, grey					gravel fill
						ML	1.5-8ft. Silty clay loam, low plasticity, moist, brown No HC observed			0.1		sandy loam / silty loam / clay loam
5							Same as above					
						SC	8-15ft. Silty loam, brown, moist No HC			0.3		
10							Same as above					
											LS	
15							End of Boring @ 15ft.			0.2		
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/9/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (3:27 PM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB7**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/10/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**9:35 AM**
DRILLER:	**Liam MacDonald**	-end:	**9:55 AM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-1ft. Brown loam, moist, rigid					
							1-13ft. silty loam, light brown/brown, moist, powdery No HC observed			0.0		
5												
10							Same as above			0.2		
						ML	Δ13-14ft. Brown clayey loam, moist No HC				LS	
15							14-15ft. Return to brown silty loam, moist No HC			0.1		
							End of Boring @ 15ft.					
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/10/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (09:50 AM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB8**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/10/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**10:05 AM**
DRILLER:	**Liam MacDonald**	-end:	**10:40 AM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-1ft. Brown loam, moist					
							1-13ft. silty loam, light brown, powdery, moist No HC observed			0.1		
5							Same as above					
							Very little recovery, powdery					
10							Same as above			0.0		
						ML	13-14ft. Brown clayey loam, low plasticity, moist				LS	
15							14-15ft. Brown silty loam, moist No HC			0.3		
							End of Boring @ 15ft.					
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/10/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (10:35 AM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB9**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/10/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**10:50 AM**
DRILLER:	**Liam MacDonald**	-end:	**11:22 AM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0												
						SM	0-6ft. Brown loam, moist, rigid compact sand silt and clay No HC observed					
										0.2		
5							Same as above					
						ML	6-13ft. Silty clay loam, brown, moist, low plasticity No HC					
10							Same as above			0.0		
							13-15ft. Silty loam, brown, moist No HC				LS	
15							End of Boring @ 15ft.			0.0		
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/10/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (11:17 AM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB10**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/10/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**11:30 AM**
DRILLER:	**Liam MacDonald**	-end:	**11:40 AM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-4ft. Brown silty clayey loam, moist No HC observed					
										0.0		
5						CL	4-6ft. Clayey loam, brown, moist, low-medium plasticity; No HC observed					
							Same as above					
							6-13.5ft. Silty loam, brown, moist No HC					
10							Same as above			0.0		
						CL	13.5-15ft. Silty clay, brown, moist, low-medium plasticity No HC				LS	
15							End of Boring @ 15ft.			0.1		
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/10/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (11:40 AM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB11**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/10/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**1:05 PM**
DRILLER:	**Liam MacDonald**	-end:	**1:40 PM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0						ML	0-1ft. Dark brown loam, moist, rigid, dense compact clay and silt No HC observed					
							1-15ft. Light brown to brown silty loam, powdery, moist No HC			0.4		
5							Same as above/very little recovery					
10							Same as above			2.1		
							Δ13ft. Small amounts of clay added to above				LS	
15							End of Boring @ 15ft.			0.9		
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/10/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (1:30 pM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB12**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/10/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**1:50 PM**
DRILLER:	**Liam MacDonald**	-end:	**2:05 PM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0												
						ML	0-15ft. Silty loam, ridgid compact silt and clay, dark brown to brown No HC					
										0.0		
5							Same as above					
							Δ7ft. Change in color to light brown, same consistancy as above					
10							Same as above			0.0		
											LS	
15							End of Boring @ 15ft.			0.6		
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/10/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (2:00 PM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB13**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/10/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**2:20 PM**
DRILLER:	**Liam MacDonald**	-end:	**2:40 PM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-1.5ft. Brown loam, moist, rigid compact clay and silt No HC observed					
						ML						
							1.5-7ft. Silty loam, light brown, powdery, moist No HC			0.0		
5							Same as above					
							7-15ft. Silty-sandy loam, light brown to brown, powder, moist No HC					
						SM						
10							Same as above			0.0		
											LS	
15							End of Boring @ 15ft.			0.1		
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/10/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (2:30 PM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB14**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/10/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**2:40 PM**
DRILLER:	**Liam MacDonald**	-end:	**3:20 PM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-5ft. Silty clayey loam, brown, ridgid compact silt and clay, low plasticity No HC observed					
						ML						
										0.1		
5							5-15ft. Silty loam, light brown, moist, powdery No HC					
10							Same as above			0.0		
											LS	
15							End of Boring @ 15ft.			0.5		
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/10/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (3:15 PM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB15**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/10/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**3:30 PM**
DRILLER:	**Liam MacDonald**	-end:	**3:50 PM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0												
						ML	0-5ft. Silty clayey loam, brown, ridgid compact silt and clay No HC observed					
5							5-15ft. Silty loam, light brown, moist, little to no plasticity No HC			0.1		
10							Same as above			0.2		
15							End of Boring @ 15ft.			0.3	LS	
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/10/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (3:45 PM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB16**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/10/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**4:00 PM**
DRILLER:	**Liam MacDonald**	-end:	**4:25 PM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-10ft. Silty clay loam. Brown, rigid, dense compact clay and silt No HC observed					
						ML						
5							Same as above			0.1		
10							10-15ft. Silty clayey loam, light brown, moist No HC			0.6		
15							End of Boring @ 15ft.			1.1	LS	
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/10/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (4:25 PM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB17**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/11/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**9:45 AM**
DRILLER:	**Liam MacDonald**	-end:	**10:40 AM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-1ft. Dark brown loam and fill material lithic fragments <2cm					
							1-10ft. Loamy clay, brown, moist, low-mid plasticity					
						SC						
5							Same as above with small lithic fragments			0.0		
10							10-15ft. Silty clayey loam, brown to dark brown, moist, low plasticity No HC observed			0.1		
						ML						
15							End of Boring @ 15ft.			0.2	LS	
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/11/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (10:30 AM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB18**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/11/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**10:50 AM**
DRILLER:	**Liam MacDonald**	-end:	**11:10 AM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-1.5ft. Dark brown loam with fill material and cobbles <3cm					
						ML	1.5-15ft. Silty clayey loam, light brown, low plasticity, moist No HC observed					
5							Same as above			0.1		
10							Same as above			0.2		
15							End of Boring @ 15ft.			0.6	LS	
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/11/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (11:00 AM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB19**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/11/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**11:15 AM**
DRILLER:	**Liam MacDonald**	-end:	**11:50 AM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-2ft. Dark brown loam with fill material, some cobbles <3cm No HC observed					
						ML	2-15ft. Silty clayey loam, light brown, moist, low plasticity No HC					
5							Same as above			0.0		
10							Same as above			0.4		
15							End of Boring @ 15ft.			0.6	LS	
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/11/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (11:45 AM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

WCEC SOIL BORING LOG

WCEC PROJECT No:	**20-13262-70**	BORING #:	**SB20**
PROJECT NAME:	**Billings Bypass I-90/Johnson Lane Interchange**	DATE:	**12/11/2020**
DRILLING COMPANY:	**WCEC, Inc.**	TIME -start:	**12:00 PM**
DRILLER:	**Liam MacDonald**	-end:	**12:15 PM**
DRILLING METHOD:	**Direct Push**		

WCEC ENVIRONMENTAL CONSULTANTS

Depth (feet)	Sampling Information T	A	R	B	N	ASTM	Material Description	Geologic Origin	WL	PID (ppm)	Sample Analysis	Lithology symbol
0							0-1.5ft. Dark brown loam and fill material, lithic fragments <2cm No HC observed					
						ML	1.5-7ft. Silty cleyey loam, brown, moist, low plasticity No HC					
5							Same as above			0.4		
							7-15ft. Silty loam, light brown, moist No HC					
10							Same as above			0.1		
15							End of Boring @ 15ft.			0.4	LS	
20												
25												

Water Level Measurements

Date	Time	Elapsed Time	Water Level	Product Level
12/11/2020			**No water encountered**	**No FP observed**

Comments: LS @ 15ft. (12:10 PM)

HC = hydrocarbon

GPS location collected with Trimble Geo7x

gravel fill
sandy loam
silty loam
clay loam

KEY

Sampling Info:
T = sample type
A = attempt
R = recovery
B = blow count
N = N value

Definitions:
WL = Water Level
Elapsed time = time between end of drilling & sampling.

Sample Types:
MS = macro
LB = large bore
DT = Dual Tube
SP15 = Screen point
HA = hand auger
SS = split spoon

Analysis:
LS = lab soil sample
LW =lab water sample

Appendix B – Soil Boring Photographic Log

PHOTO 1: Corner of Johnson Ln & Frontage Road looking north (SB1 – SB3).

PHOTO 2: South of Town Pump Pilot looking north (SB4).

.

PHOTOGRAPHIC LOG

MDT Subsurface Investigation
Billings Bypass Project I-90/Johnson Ln Interchange
Billings, MT

DATE: 01/04/21	SCALE: N/A
PROJECT NO: 13262	

WCEC
ENVIRONMENTAL CONSULTANTS

PHOTO 3: North of Town Pump Flying J looking northeast (SB8 – SB11).

PHOTO 4: West of Casey's looking north (SB19 – SB20).

.

PHOTOGRAPHIC LOG

MDT Subsurface Investigation
Billings Bypass Project I-90/Johnson Ln Interchange
Billings, MT

DATE: 01/04/21	SCALE: N/A
PROJECT NO: 13262	

WCEC
ENVIRONMENTAL CONSULTANTS

Appendix C – Laboratory Analytical Reports and Data Validation

ANALYTICAL SUMMARY REPORT

December 18, 2020

MT Dept of Transportation
PO Box 201001
Helena, MT 59620-1001

Work Order: B20121111

Project Name: MDT Billings Bypass Project I-90/Johnson Ln Interc

Energy Laboratories Inc Billings MT received the following 20 samples for MT Dept of Transportation on 12/11/2020 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B20121111-001	SB1	12/09/20 12:15	12/11/20	Soil	EPH-Ultrasonic Extraction SW3550C Methanol Extraction for Volatiles SW5035 Hydrocarbons, Extractable Petroleum-Scrn Volatile Petroleum Hydrocarbons Moisture Moisture Prep SW3550C Percent Moisture
B20121111-002	SB2	12/09/20 13:30	12/11/20	Soil	Same As Above
B20121111-003	SB3	12/09/20 14:00	12/11/20	Soil	Same As Above
B20121111-004	SB4	12/09/20 14:35	12/11/20	Soil	Same As Above
B20121111-005	SB5	12/09/20 15:05	12/11/20	Soil	Same As Above
B20121111-006	SB6	12/09/20 15:27	12/11/20	Soil	Same As Above
B20121111-007	SB7	12/10/20 9:50	12/11/20	Soil	Same As Above
B20121111-008	SB8	12/10/20 10:35	12/11/20	Soil	Same As Above
B20121111-009	SB9	12/10/20 11:17	12/11/20	Soil	Same As Above
B20121111-010	SB10	12/10/20 11:40	12/11/20	Soil	Same As Above
B20121111-011	SB11	12/10/20 13:30	12/11/20	Soil	Same As Above
B20121111-012	SB12	12/10/20 14:00	12/11/20	Soil	Same As Above
B20121111-013	SB13	12/10/20 14:30	12/11/20	Soil	Same As Above
B20121111-014	SB14	12/10/20 15:15	12/11/20	Soil	Same As Above
B20121111-015	SB15	12/10/20 15:45	12/11/20	Soil	Same As Above
B20121111-016	SB16	12/10/20 16:25	12/11/20	Soil	Same As Above
B20121111-017	SB17	12/11/20 10:30	12/11/20	Soil	Same As Above
B20121111-018	SB18	12/11/20 11:00	12/11/20	Soil	Same As Above
B20121111-019	SB19	12/11/20 11:45	12/11/20	Soil	Same As Above
B20121111-020	SB20	12/11/20 12:10	12/11/20	Soil	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

ANALYTICAL SUMMARY REPORT

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-001
Client Sample ID: SB1

Report Date: 12/18/20
Collection Date: 12/09/20 12:15
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	18	wt%		0.2		SW3550C	12/15/20 11:00 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.12	0.078	MA-VPH	12/16/20 13:30 / jp
Benzene	ND	mg/kg-dry		0.061	0.07	MA-VPH	12/16/20 13:30 / jp
Toluene	ND	mg/kg-dry		0.061	21	MA-VPH	12/16/20 13:30 / jp
Ethylbenzene	ND	mg/kg-dry		0.061	6.4	MA-VPH	12/16/20 13:30 / jp
m+p-Xylenes	ND	mg/kg-dry		0.061		MA-VPH	12/16/20 13:30 / jp
o-Xylene	ND	mg/kg-dry		0.061		MA-VPH	12/16/20 13:30 / jp
Xylenes, Total	ND	mg/kg-dry		0.061	72	MA-VPH	12/16/20 13:30 / jp
Naphthalene	ND	mg/kg-dry		0.12	4.3	MA-VPH	12/16/20 13:30 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.4	130	MA-VPH	12/16/20 13:30 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.4	52	MA-VPH	12/16/20 13:30 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.4	77	MA-VPH	12/16/20 13:30 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.4		MA-VPH	12/16/20 13:30 / jp
Surr: VPH Aromatics Surrogate	94.0	%REC		70-130		MA-VPH	12/16/20 13:30 / jp
Surr: VPH Aliphatics Surrogate	105	%REC		70-130		MA-VPH	12/16/20 13:30 / jp
- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.							
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.							
EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	12	mg/kg-dry	J	12	200	SW8015M	12/16/20 17:34 / amn
Surr: o-Terphenyl	63.0	%REC		40-140		SW8015M	12/16/20 17:34 / amn
- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.							

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
J - Estimated value - analyte was present but less than the Reporting Limit (RL)
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-002
Client Sample ID: SB2

Report Date: 12/18/20
Collection Date: 12/09/20 13:30
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	20	wt%		0.2		SW3550C	12/15/20 11:14 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.12	0.078	MA-VPH	12/17/20 08:48 / jp
Benzene	ND	mg/kg-dry		0.062	0.07	MA-VPH	12/17/20 08:48 / jp
Toluene	ND	mg/kg-dry		0.062	21	MA-VPH	12/17/20 08:48 / jp
Ethylbenzene	ND	mg/kg-dry		0.062	6.4	MA-VPH	12/17/20 08:48 / jp
m+p-Xylenes	ND	mg/kg-dry		0.062		MA-VPH	12/17/20 08:48 / jp
o-Xylene	ND	mg/kg-dry		0.062		MA-VPH	12/17/20 08:48 / jp
Xylenes, Total	ND	mg/kg-dry		0.062	72	MA-VPH	12/17/20 08:48 / jp
Naphthalene	ND	mg/kg-dry		0.12	4.3	MA-VPH	12/17/20 08:48 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.5	130	MA-VPH	12/17/20 08:48 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.5	52	MA-VPH	12/17/20 08:48 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.5	77	MA-VPH	12/17/20 08:48 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.5		MA-VPH	12/17/20 08:48 / jp
Surr: VPH Aromatics Surrogate	96.0	%REC		70-130		MA-VPH	12/17/20 08:48 / jp
Surr: VPH Aliphatics Surrogate	106	%REC		70-130		MA-VPH	12/17/20 08:48 / jp
- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.							
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.							
EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		12	200	SW8015M	12/16/20 20:31 / amn
Surr: o-Terphenyl	62.0	%REC		40-140		SW8015M	12/16/20 20:31 / amn
- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.							

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-003
Client Sample ID: SB3

Report Date: 12/18/20
Collection Date: 12/09/20 14:00
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	12	wt%		0.2		SW3550C	12/15/20 11:26 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.11	0.078	MA-VPH	12/16/20 17:05 / jp
Benzene	ND	mg/kg-dry		0.057	0.07	MA-VPH	12/16/20 17:05 / jp
Toluene	ND	mg/kg-dry		0.057	21	MA-VPH	12/16/20 17:05 / jp
Ethylbenzene	ND	mg/kg-dry		0.057	6.4	MA-VPH	12/16/20 17:05 / jp
m+p-Xylenes	ND	mg/kg-dry		0.057		MA-VPH	12/16/20 17:05 / jp
o-Xylene	ND	mg/kg-dry		0.057		MA-VPH	12/16/20 17:05 / jp
Xylenes, Total	ND	mg/kg-dry		0.057	72	MA-VPH	12/16/20 17:05 / jp
Naphthalene	ND	mg/kg-dry		0.11	4.3	MA-VPH	12/16/20 17:05 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.3	130	MA-VPH	12/16/20 17:05 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.3	52	MA-VPH	12/16/20 17:05 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.3	77	MA-VPH	12/16/20 17:05 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.3		MA-VPH	12/16/20 17:05 / jp
Surr: VPH Aromatics Surrogate	95.0	%REC		70-130		MA-VPH	12/16/20 17:05 / jp
Surr: VPH Aliphatics Surrogate	98.0	%REC		70-130		MA-VPH	12/16/20 17:05 / jp

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		11	200	SW8015M	12/16/20 21:15 / amn
Surr: o-Terphenyl	74.0	%REC		40-140		SW8015M	12/16/20 21:15 / amn

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-004
Client Sample ID: SB4

Report Date: 12/18/20
Collection Date: 12/09/20 14:35
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	10	wt%		0.2		SW3550C	12/15/20 11:34 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.11	0.078	MA-VPH	12/17/20 09:25 / jp
Benzene	ND	mg/kg-dry		0.056	0.07	MA-VPH	12/17/20 09:25 / jp
Toluene	ND	mg/kg-dry		0.056	21	MA-VPH	12/17/20 09:25 / jp
Ethylbenzene	ND	mg/kg-dry		0.056	6.4	MA-VPH	12/17/20 09:25 / jp
m+p-Xylenes	ND	mg/kg-dry		0.056		MA-VPH	12/17/20 09:25 / jp
o-Xylene	ND	mg/kg-dry		0.056		MA-VPH	12/17/20 09:25 / jp
Xylenes, Total	ND	mg/kg-dry		0.056	72	MA-VPH	12/17/20 09:25 / jp
Naphthalene	ND	mg/kg-dry		0.11	4.3	MA-VPH	12/17/20 09:25 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.2	130	MA-VPH	12/17/20 09:25 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.2	52	MA-VPH	12/17/20 09:25 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.2	77	MA-VPH	12/17/20 09:25 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.2		MA-VPH	12/17/20 09:25 / jp
Surr: VPH Aromatics Surrogate	95.0	%REC		70-130		MA-VPH	12/17/20 09:25 / jp
Surr: VPH Aliphatics Surrogate	106	%REC		70-130		MA-VPH	12/17/20 09:25 / jp

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		11	200	SW8015M	12/16/20 21:59 / amn
Surr: o-Terphenyl	73.0	%REC		40-140		SW8015M	12/16/20 21:59 / amn

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-005
Client Sample ID: SB5

Report Date: 12/18/20
Collection Date: 12/09/20 15:05
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	15	wt%		0.2		SW3550C	12/15/20 11:53 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.12	0.078	MA-VPH	12/16/20 18:54 / jp
Benzene	ND	mg/kg-dry		0.059	0.07	MA-VPH	12/16/20 18:54 / jp
Toluene	ND	mg/kg-dry		0.059	21	MA-VPH	12/16/20 18:54 / jp
Ethylbenzene	ND	mg/kg-dry		0.059	6.4	MA-VPH	12/16/20 18:54 / jp
m+p-Xylenes	ND	mg/kg-dry		0.059		MA-VPH	12/16/20 18:54 / jp
o-Xylene	ND	mg/kg-dry		0.059		MA-VPH	12/16/20 18:54 / jp
Xylenes, Total	ND	mg/kg-dry		0.059	72	MA-VPH	12/16/20 18:54 / jp
Naphthalene	ND	mg/kg-dry		0.12	4.3	MA-VPH	12/16/20 18:54 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.4	130	MA-VPH	12/16/20 18:54 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.4	52	MA-VPH	12/16/20 18:54 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.4	77	MA-VPH	12/16/20 18:54 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.4		MA-VPH	12/16/20 18:54 / jp
Surr: VPH Aromatics Surrogate	94.0	%REC		70-130		MA-VPH	12/16/20 18:54 / jp
Surr: VPH Aliphatics Surrogate	99.0	%REC		70-130		MA-VPH	12/16/20 18:54 / jp

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		12	200	SW8015M	12/16/20 22:44 / amn
Surr: o-Terphenyl	73.0	%REC		40-140		SW8015M	12/16/20 22:44 / amn

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-006
Client Sample ID: SB6

Report Date: 12/18/20
Collection Date: 12/09/20 15:27
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	14	wt%		0.2		SW3550C	12/15/20 11:53 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.12	0.078	MA-VPH	12/16/20 20:05 / jp
Benzene	ND	mg/kg-dry		0.058	0.07	MA-VPH	12/16/20 20:05 / jp
Toluene	ND	mg/kg-dry		0.058	21	MA-VPH	12/16/20 20:05 / jp
Ethylbenzene	ND	mg/kg-dry		0.058	6.4	MA-VPH	12/16/20 20:05 / jp
m+p-Xylenes	ND	mg/kg-dry		0.058		MA-VPH	12/16/20 20:05 / jp
o-Xylene	ND	mg/kg-dry		0.058		MA-VPH	12/16/20 20:05 / jp
Xylenes, Total	ND	mg/kg-dry		0.058	72	MA-VPH	12/16/20 20:05 / jp
Naphthalene	ND	mg/kg-dry		0.12	4.3	MA-VPH	12/16/20 20:05 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.3	130	MA-VPH	12/16/20 20:05 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.3	52	MA-VPH	12/16/20 20:05 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.3	77	MA-VPH	12/16/20 20:05 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.3		MA-VPH	12/16/20 20:05 / jp
Surr: VPH Aromatics Surrogate	91.0	%REC		70-130		MA-VPH	12/16/20 20:05 / jp
Surr: VPH Aliphatics Surrogate	98.0	%REC		70-130		MA-VPH	12/16/20 20:05 / jp

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		12	200	SW8015M	12/16/20 23:28 / amn
Surr: o-Terphenyl	79.0	%REC		40-140		SW8015M	12/16/20 23:28 / amn

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-007
Client Sample ID: SB7

Report Date: 12/18/20
Collection Date: 12/10/20 09:50
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	9.9	wt%		0.2		SW3550C	12/15/20 12:00 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.11	0.078	MA-VPH	12/17/20 11:12 / jp
Benzene	ND	mg/kg-dry		0.056	0.07	MA-VPH	12/17/20 11:12 / jp
Toluene	ND	mg/kg-dry		0.056	21	MA-VPH	12/17/20 11:12 / jp
Ethylbenzene	ND	mg/kg-dry		0.056	6.4	MA-VPH	12/17/20 11:12 / jp
m+p-Xylenes	ND	mg/kg-dry		0.056		MA-VPH	12/17/20 11:12 / jp
o-Xylene	ND	mg/kg-dry		0.056		MA-VPH	12/17/20 11:12 / jp
Xylenes, Total	ND	mg/kg-dry		0.056	72	MA-VPH	12/17/20 11:12 / jp
Naphthalene	ND	mg/kg-dry		0.11	4.3	MA-VPH	12/17/20 11:12 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.2	130	MA-VPH	12/17/20 11:12 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.2	52	MA-VPH	12/17/20 11:12 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.2	77	MA-VPH	12/17/20 11:12 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.2		MA-VPH	12/17/20 11:12 / jp
Surr: VPH Aromatics Surrogate	97.0	%REC		70-130		MA-VPH	12/17/20 11:12 / jp
Surr: VPH Aliphatics Surrogate	107	%REC		70-130		MA-VPH	12/17/20 11:12 / jp

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		11	200	SW8015M	12/17/20 03:08 / amn
Surr: o-Terphenyl	81.0	%REC		40-140		SW8015M	12/17/20 03:08 / amn

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-008
Client Sample ID: SB8

Report Date: 12/18/20
Collection Date: 12/10/20 10:35
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	12	wt%		0.2		SW3550C	12/15/20 12:07 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.11	0.078	MA-VPH	12/16/20 21:53 / jp
Benzene	ND	mg/kg-dry		0.057	0.07	MA-VPH	12/16/20 21:53 / jp
Toluene	ND	mg/kg-dry		0.057	21	MA-VPH	12/16/20 21:53 / jp
Ethylbenzene	ND	mg/kg-dry		0.057	6.4	MA-VPH	12/16/20 21:53 / jp
m+p-Xylenes	ND	mg/kg-dry		0.057		MA-VPH	12/16/20 21:53 / jp
o-Xylene	ND	mg/kg-dry		0.057		MA-VPH	12/16/20 21:53 / jp
Xylenes, Total	ND	mg/kg-dry		0.057	72	MA-VPH	12/16/20 21:53 / jp
Naphthalene	ND	mg/kg-dry		0.11	4.3	MA-VPH	12/16/20 21:53 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.3	130	MA-VPH	12/16/20 21:53 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.3	52	MA-VPH	12/16/20 21:53 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.3	77	MA-VPH	12/16/20 21:53 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.3		MA-VPH	12/16/20 21:53 / jp
Surr: VPH Aromatics Surrogate	97.0	%REC		70-130		MA-VPH	12/16/20 21:53 / jp
Surr: VPH Aliphatics Surrogate	102	%REC		70-130		MA-VPH	12/16/20 21:53 / jp

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	12	mg/kg-dry		11	200	SW8015M	12/17/20 03:52 / amn
Surr: o-Terphenyl	80.0	%REC		40-140		SW8015M	12/17/20 03:52 / amn

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-009
Client Sample ID: SB9

Report Date: 12/18/20
Collection Date: 12/10/20 11:17
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	14	wt%		0.2		SW3550C	12/15/20 13:52 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.12	0.078	MA-VPH	12/16/20 22:29 / jp
Benzene	ND	mg/kg-dry		0.058	0.07	MA-VPH	12/16/20 22:29 / jp
Toluene	ND	mg/kg-dry		0.058	21	MA-VPH	12/16/20 22:29 / jp
Ethylbenzene	ND	mg/kg-dry		0.058	6.4	MA-VPH	12/16/20 22:29 / jp
m+p-Xylenes	ND	mg/kg-dry		0.058		MA-VPH	12/16/20 22:29 / jp
o-Xylene	ND	mg/kg-dry		0.058		MA-VPH	12/16/20 22:29 / jp
Xylenes, Total	ND	mg/kg-dry		0.058	72	MA-VPH	12/16/20 22:29 / jp
Naphthalene	ND	mg/kg-dry		0.12	4.3	MA-VPH	12/16/20 22:29 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.3	130	MA-VPH	12/16/20 22:29 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.3	52	MA-VPH	12/16/20 22:29 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.3	77	MA-VPH	12/16/20 22:29 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.3		MA-VPH	12/16/20 22:29 / jp
Surr: VPH Aromatics Surrogate	91.0	%REC		70-130		MA-VPH	12/16/20 22:29 / jp
Surr: VPH Aliphatics Surrogate	101	%REC		70-130		MA-VPH	12/16/20 22:29 / jp

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		12	200	SW8015M	12/17/20 04:36 / amn
Surr: o-Terphenyl	79.0	%REC		40-140		SW8015M	12/17/20 04:36 / amn

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-010
Client Sample ID: SB10

Report Date: 12/18/20
Collection Date: 12/10/20 11:40
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	21	wt%		0.2		SW3550C	12/15/20 14:02 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.13	0.078	MA-VPH	12/16/20 23:41 / jp
Benzene	ND	mg/kg-dry		0.064	0.07	MA-VPH	12/16/20 23:41 / jp
Toluene	ND	mg/kg-dry		0.064	21	MA-VPH	12/16/20 23:41 / jp
Ethylbenzene	ND	mg/kg-dry		0.064	6.4	MA-VPH	12/16/20 23:41 / jp
m+p-Xylenes	ND	mg/kg-dry		0.064		MA-VPH	12/16/20 23:41 / jp
o-Xylene	ND	mg/kg-dry		0.064		MA-VPH	12/16/20 23:41 / jp
Xylenes, Total	ND	mg/kg-dry		0.064	72	MA-VPH	12/16/20 23:41 / jp
Naphthalene	ND	mg/kg-dry		0.13	4.3	MA-VPH	12/16/20 23:41 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.5	130	MA-VPH	12/16/20 23:41 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.5	52	MA-VPH	12/16/20 23:41 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.5	77	MA-VPH	12/16/20 23:41 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.5		MA-VPH	12/16/20 23:41 / jp
Surr: VPH Aromatics Surrogate	92.0	%REC		70-130		MA-VPH	12/16/20 23:41 / jp
Surr: VPH Aliphatics Surrogate	102	%REC		70-130		MA-VPH	12/16/20 23:41 / jp

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		13	200	SW8015M	12/17/20 05:20 / amn
Surr: o-Terphenyl	82.0	%REC		40-140		SW8015M	12/17/20 05:20 / amn

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-011
Client Sample ID: SB11

Report Date: 12/18/20
Collection Date: 12/10/20 13:30
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	11	wt%		0.2		SW3550C	12/15/20 14:13 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.11	0.078	MA-VPH	12/17/20 00:16 / jp
Benzene	ND	mg/kg-dry		0.056	0.07	MA-VPH	12/17/20 00:16 / jp
Toluene	ND	mg/kg-dry		0.056	21	MA-VPH	12/17/20 00:16 / jp
Ethylbenzene	ND	mg/kg-dry		0.056	6.4	MA-VPH	12/17/20 00:16 / jp
m+p-Xylenes	ND	mg/kg-dry		0.056		MA-VPH	12/17/20 00:16 / jp
o-Xylene	ND	mg/kg-dry		0.056		MA-VPH	12/17/20 00:16 / jp
Xylenes, Total	ND	mg/kg-dry		0.056	72	MA-VPH	12/17/20 00:16 / jp
Naphthalene	ND	mg/kg-dry		0.11	4.3	MA-VPH	12/17/20 00:16 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.2	130	MA-VPH	12/17/20 00:16 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.2	52	MA-VPH	12/17/20 00:16 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.2	77	MA-VPH	12/17/20 00:16 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.2		MA-VPH	12/17/20 00:16 / jp
Surr: VPH Aromatics Surrogate	97.0	%REC		70-130		MA-VPH	12/17/20 00:16 / jp
Surr: VPH Aliphatics Surrogate	108	%REC		70-130		MA-VPH	12/17/20 00:16 / jp
- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.							
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.							
EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		11	200	SW8015M	12/17/20 06:04 / amn
Surr: o-Terphenyl	80.0	%REC		40-140		SW8015M	12/17/20 06:04 / amn
- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.							

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-012
Client Sample ID: SB12

Report Date: 12/18/20
Collection Date: 12/10/20 14:00
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	7.5	wt%		0.2		SW3550C	12/15/20 14:25 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.11	0.078	MA-VPH	12/17/20 11:48 / jp
Benzene	ND	mg/kg-dry		0.054	0.07	MA-VPH	12/17/20 11:48 / jp
Toluene	ND	mg/kg-dry		0.054	21	MA-VPH	12/17/20 11:48 / jp
Ethylbenzene	ND	mg/kg-dry		0.054	6.4	MA-VPH	12/17/20 11:48 / jp
m+p-Xylenes	ND	mg/kg-dry		0.054		MA-VPH	12/17/20 11:48 / jp
o-Xylene	ND	mg/kg-dry		0.054		MA-VPH	12/17/20 11:48 / jp
Xylenes, Total	ND	mg/kg-dry		0.054	72	MA-VPH	12/17/20 11:48 / jp
Naphthalene	ND	mg/kg-dry		0.11	4.3	MA-VPH	12/17/20 11:48 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.2	130	MA-VPH	12/17/20 11:48 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.2	52	MA-VPH	12/17/20 11:48 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.2	77	MA-VPH	12/17/20 11:48 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.2		MA-VPH	12/17/20 11:48 / jp
Surr: VPH Aromatics Surrogate	96.0	%REC		70-130		MA-VPH	12/17/20 11:48 / jp
Surr: VPH Aliphatics Surrogate	107	%REC		70-130		MA-VPH	12/17/20 11:48 / jp
- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.							
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.							
EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		11	200	SW8015M	12/17/20 07:32 / amn
Surr: o-Terphenyl	79.0	%REC		40-140		SW8015M	12/17/20 07:32 / amn
- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.							

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-013
Client Sample ID: SB13

Report Date: 12/18/20
Collection Date: 12/10/20 14:30
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	15	wt%		0.2		SW3550C	12/15/20 14:32 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.12	0.078	MA-VPH	12/17/20 02:04 / jp
Benzene	ND	mg/kg-dry		0.059	0.07	MA-VPH	12/17/20 02:04 / jp
Toluene	ND	mg/kg-dry		0.059	21	MA-VPH	12/17/20 02:04 / jp
Ethylbenzene	ND	mg/kg-dry		0.059	6.4	MA-VPH	12/17/20 02:04 / jp
m+p-Xylenes	ND	mg/kg-dry		0.059		MA-VPH	12/17/20 02:04 / jp
o-Xylene	ND	mg/kg-dry		0.059		MA-VPH	12/17/20 02:04 / jp
Xylenes, Total	ND	mg/kg-dry		0.059	72	MA-VPH	12/17/20 02:04 / jp
Naphthalene	ND	mg/kg-dry		0.12	4.3	MA-VPH	12/17/20 02:04 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.4	130	MA-VPH	12/17/20 02:04 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.4	52	MA-VPH	12/17/20 02:04 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.4	77	MA-VPH	12/17/20 02:04 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.4		MA-VPH	12/17/20 02:04 / jp
Surr: VPH Aromatics Surrogate	88.0	%REC		70-130		MA-VPH	12/17/20 02:04 / jp
Surr: VPH Aliphatics Surrogate	92.0	%REC		70-130		MA-VPH	12/17/20 02:04 / jp

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		12	200	SW8015M	12/17/20 08:16 / amn
Surr: o-Terphenyl	76.0	%REC		40-140		SW8015M	12/17/20 08:16 / amn

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-014
Client Sample ID: SB14

Report Date: 12/18/20
Collection Date: 12/10/20 15:15
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	13	wt%		0.2		SW3550C	12/15/20 14:40 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.11	0.078	MA-VPH	12/17/20 03:16 / jp
Benzene	ND	mg/kg-dry		0.057	0.07	MA-VPH	12/17/20 03:16 / jp
Toluene	ND	mg/kg-dry		0.057	21	MA-VPH	12/17/20 03:16 / jp
Ethylbenzene	ND	mg/kg-dry		0.057	6.4	MA-VPH	12/17/20 03:16 / jp
m+p-Xylenes	ND	mg/kg-dry		0.057		MA-VPH	12/17/20 03:16 / jp
o-Xylene	ND	mg/kg-dry		0.057		MA-VPH	12/17/20 03:16 / jp
Xylenes, Total	ND	mg/kg-dry		0.057	72	MA-VPH	12/17/20 03:16 / jp
Naphthalene	ND	mg/kg-dry		0.11	4.3	MA-VPH	12/17/20 03:16 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.3	130	MA-VPH	12/17/20 03:16 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.3	52	MA-VPH	12/17/20 03:16 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.3	77	MA-VPH	12/17/20 03:16 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.3		MA-VPH	12/17/20 03:16 / jp
Surr: VPH Aromatics Surrogate	93.0	%REC		70-130		MA-VPH	12/17/20 03:16 / jp
Surr: VPH Aliphatics Surrogate	104	%REC		70-130		MA-VPH	12/17/20 03:16 / jp

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		11	200	SW8015M	12/17/20 09:00 / amn
Surr: o-Terphenyl	82.0	%REC		40-140		SW8015M	12/17/20 09:00 / amn

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-015
Client Sample ID: SB15

Report Date: 12/18/20
Collection Date: 12/10/20 15:45
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	9.3	wt%		0.2		SW3550C	12/15/20 14:48 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.11	0.078	MA-VPH	12/17/20 03:51 / jp
Benzene	ND	mg/kg-dry		0.055	0.07	MA-VPH	12/17/20 03:51 / jp
Toluene	ND	mg/kg-dry		0.055	21	MA-VPH	12/17/20 03:51 / jp
Ethylbenzene	ND	mg/kg-dry		0.055	6.4	MA-VPH	12/17/20 03:51 / jp
m+p-Xylenes	ND	mg/kg-dry		0.055		MA-VPH	12/17/20 03:51 / jp
o-Xylene	ND	mg/kg-dry		0.055		MA-VPH	12/17/20 03:51 / jp
Xylenes, Total	ND	mg/kg-dry		0.055	72	MA-VPH	12/17/20 03:51 / jp
Naphthalene	ND	mg/kg-dry		0.11	4.3	MA-VPH	12/17/20 03:51 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.2	130	MA-VPH	12/17/20 03:51 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.2	52	MA-VPH	12/17/20 03:51 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.2	77	MA-VPH	12/17/20 03:51 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.2		MA-VPH	12/17/20 03:51 / jp
Surr: VPH Aromatics Surrogate	93.0	%REC		70-130		MA-VPH	12/17/20 03:51 / jp
Surr: VPH Aliphatics Surrogate	101	%REC		70-130		MA-VPH	12/17/20 03:51 / jp

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		11	200	SW8015M	12/17/20 09:44 / amn
Surr: o-Terphenyl	75.0	%REC		40-140		SW8015M	12/17/20 09:44 / amn

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-016
Client Sample ID: SB16

Report Date: 12/18/20
Collection Date: 12/10/20 16:25
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	16	wt%		0.2		SW3550C	12/15/20 14:57 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.12	0.078	MA-VPH	12/17/20 05:03 / jp
Benzene	ND	mg/kg-dry		0.060	0.07	MA-VPH	12/17/20 05:03 / jp
Toluene	ND	mg/kg-dry		0.060	21	MA-VPH	12/17/20 05:03 / jp
Ethylbenzene	ND	mg/kg-dry		0.060	6.4	MA-VPH	12/17/20 05:03 / jp
m+p-Xylenes	ND	mg/kg-dry		0.060		MA-VPH	12/17/20 05:03 / jp
o-Xylene	ND	mg/kg-dry		0.060		MA-VPH	12/17/20 05:03 / jp
Xylenes, Total	ND	mg/kg-dry		0.060	72	MA-VPH	12/17/20 05:03 / jp
Naphthalene	ND	mg/kg-dry		0.12	4.3	MA-VPH	12/17/20 05:03 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.4	130	MA-VPH	12/17/20 05:03 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.4	52	MA-VPH	12/17/20 05:03 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.4	77	MA-VPH	12/17/20 05:03 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.4		MA-VPH	12/17/20 05:03 / jp
Surr: VPH Aromatics Surrogate	89.0	%REC		70-130		MA-VPH	12/17/20 05:03 / jp
Surr: VPH Aliphatics Surrogate	97.0	%REC		70-130		MA-VPH	12/17/20 05:03 / jp

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		12	200	SW8015M	12/17/20 14:06 / amn
Surr: o-Terphenyl	77.0	%REC		40-140		SW8015M	12/17/20 14:06 / amn

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-017
Client Sample ID: SB17

Report Date: 12/18/20
Collection Date: 12/11/20 10:30
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	16	wt%		0.2		SW3550C	12/15/20 15:04 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.12	0.078	MA-VPH	12/17/20 05:38 / jp
Benzene	ND	mg/kg-dry		0.060	0.07	MA-VPH	12/17/20 05:38 / jp
Toluene	ND	mg/kg-dry		0.060	21	MA-VPH	12/17/20 05:38 / jp
Ethylbenzene	ND	mg/kg-dry		0.060	6.4	MA-VPH	12/17/20 05:38 / jp
m+p-Xylenes	ND	mg/kg-dry		0.060		MA-VPH	12/17/20 05:38 / jp
o-Xylene	ND	mg/kg-dry		0.060		MA-VPH	12/17/20 05:38 / jp
Xylenes, Total	ND	mg/kg-dry		0.060	72	MA-VPH	12/17/20 05:38 / jp
Naphthalene	ND	mg/kg-dry		0.12	4.3	MA-VPH	12/17/20 05:38 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.4	130	MA-VPH	12/17/20 05:38 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.4	52	MA-VPH	12/17/20 05:38 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.4	77	MA-VPH	12/17/20 05:38 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.4		MA-VPH	12/17/20 05:38 / jp
Surr: VPH Aromatics Surrogate	90.0	%REC		70-130		MA-VPH	12/17/20 05:38 / jp
Surr: VPH Aliphatics Surrogate	100	%REC		70-130		MA-VPH	12/17/20 05:38 / jp
- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.							
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.							
EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		12	200	SW8015M	12/17/20 14:50 / amn
Surr: o-Terphenyl	42.0	%REC		40-140		SW8015M	12/17/20 14:50 / amn
- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.							

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-018
Client Sample ID: SB18

Report Date: 12/18/20
Collection Date: 12/11/20 11:00
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	14	wt%		0.2		SW3550C	12/15/20 15:12 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.12	0.078	MA-VPH	12/17/20 06:50 / jp
Benzene	ND	mg/kg-dry		0.059	0.07	MA-VPH	12/17/20 06:50 / jp
Toluene	ND	mg/kg-dry		0.059	21	MA-VPH	12/17/20 06:50 / jp
Ethylbenzene	ND	mg/kg-dry		0.059	6.4	MA-VPH	12/17/20 06:50 / jp
m+p-Xylenes	ND	mg/kg-dry		0.059		MA-VPH	12/17/20 06:50 / jp
o-Xylene	ND	mg/kg-dry		0.059		MA-VPH	12/17/20 06:50 / jp
Xylenes, Total	ND	mg/kg-dry		0.059	72	MA-VPH	12/17/20 06:50 / jp
Naphthalene	ND	mg/kg-dry		0.12	4.3	MA-VPH	12/17/20 06:50 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.3	130	MA-VPH	12/17/20 06:50 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.3	52	MA-VPH	12/17/20 06:50 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.3	77	MA-VPH	12/17/20 06:50 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.3		MA-VPH	12/17/20 06:50 / jp
Surr: VPH Aromatics Surrogate	85.0	%REC		70-130		MA-VPH	12/17/20 06:50 / jp
Surr: VPH Aliphatics Surrogate	94.0	%REC		70-130		MA-VPH	12/17/20 06:50 / jp

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		12	200	SW8015M	12/17/20 15:34 / amn
Surr: o-Terphenyl	78.0	%REC		40-140		SW8015M	12/17/20 15:34 / amn

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-019
Client Sample ID: SB19

Report Date: 12/18/20
Collection Date: 12/11/20 11:45
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	16	wt%		0.2		SW3550C	12/15/20 15:20 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.12	0.078	MA-VPH	12/17/20 12:24 / jp
Benzene	ND	mg/kg-dry		0.060	0.07	MA-VPH	12/17/20 12:24 / jp
Toluene	ND	mg/kg-dry		0.060	21	MA-VPH	12/17/20 12:24 / jp
Ethylbenzene	ND	mg/kg-dry		0.060	6.4	MA-VPH	12/17/20 12:24 / jp
m+p-Xylenes	ND	mg/kg-dry		0.060		MA-VPH	12/17/20 12:24 / jp
o-Xylene	ND	mg/kg-dry		0.060		MA-VPH	12/17/20 12:24 / jp
Xylenes, Total	ND	mg/kg-dry		0.060	72	MA-VPH	12/17/20 12:24 / jp
Naphthalene	ND	mg/kg-dry		0.12	4.3	MA-VPH	12/17/20 12:24 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.4	130	MA-VPH	12/17/20 12:24 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.4	52	MA-VPH	12/17/20 12:24 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.4	77	MA-VPH	12/17/20 12:24 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.4		MA-VPH	12/17/20 12:24 / jp
Surr: VPH Aromatics Surrogate	92.0	%REC		70-130		MA-VPH	12/17/20 12:24 / jp
Surr: VPH Aliphatics Surrogate	102	%REC		70-130		MA-VPH	12/17/20 12:24 / jp

- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.

EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		12	200	SW8015M	12/17/20 16:17 / amn
Surr: o-Terphenyl	78.0	%REC		40-140		SW8015M	12/17/20 16:17 / amn

- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: MT Dept of Transportation
Project: MDT Billings Bypass Project I-90/Johnson Ln Interc
Lab ID: B20121111-020
Client Sample ID: SB20

Report Date: 12/18/20
Collection Date: 12/11/20 12:10
DateReceived: 12/11/20
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL CHARACTERISTICS							
Moisture	11	wt%		0.2		SW3550C	12/15/20 15:27 / amn
PETROLEUM HYDROCARBONS-VOLATILE (VPH)							
Methyl tert-butyl ether (MTBE)	ND	mg/kg-dry		0.11	0.078	MA-VPH	12/17/20 08:13 / jp
Benzene	ND	mg/kg-dry		0.056	0.07	MA-VPH	12/17/20 08:13 / jp
Toluene	ND	mg/kg-dry		0.056	21	MA-VPH	12/17/20 08:13 / jp
Ethylbenzene	ND	mg/kg-dry		0.056	6.4	MA-VPH	12/17/20 08:13 / jp
m+p-Xylenes	ND	mg/kg-dry		0.056		MA-VPH	12/17/20 08:13 / jp
o-Xylene	ND	mg/kg-dry		0.056		MA-VPH	12/17/20 08:13 / jp
Xylenes, Total	ND	mg/kg-dry		0.056	72	MA-VPH	12/17/20 08:13 / jp
Naphthalene	ND	mg/kg-dry		0.11	4.3	MA-VPH	12/17/20 08:13 / jp
C9 to C10 Aromatics	ND	mg/kg-dry		2.2	130	MA-VPH	12/17/20 08:13 / jp
C5 to C8 Aliphatics	ND	mg/kg-dry		2.2	52	MA-VPH	12/17/20 08:13 / jp
C9 to C12 Aliphatics	ND	mg/kg-dry		2.2	77	MA-VPH	12/17/20 08:13 / jp
Total Purgeable Hydrocarbons	ND	mg/kg-dry		2.2		MA-VPH	12/17/20 08:13 / jp
Surr: VPH Aromatics Surrogate	90.0	%REC		70-130		MA-VPH	12/17/20 08:13 / jp
Surr: VPH Aliphatics Surrogate	100	%REC		70-130		MA-VPH	12/17/20 08:13 / jp
- Note 1: The C5 to C8 Aliphatics value is corrected for aromatic constituents Benzene and Toluene.							
- Note 2: The C9 to C12 Aliphatics value is corrected for aromatic constituents Ethylbenzene, m+p-Xylenes, o-Xylene and C9 to C10 Aromatics.							
EXTRACTABLE PETROLEUM HYDROCARBONS-SCREEN							
Total Extractable Hydrocarbons	ND	mg/kg-dry		11	200	SW8015M	12/17/20 17:01 / amn
Surr: o-Terphenyl	77.0	%REC		40-140		SW8015M	12/17/20 17:01 / amn
- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time.							

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: MT Dept of Transportation **Work Order:** B20121111 **Report Date:** 12/18/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-VPH										Batch: 151330
Lab ID: LCS-151330	16	Laboratory Control Sample				Run: PE2_201216A				12/16/20 11:42
1,2,4-Trimethylbenzene		2.29	mg/kg	0.10	92	70	130			
2,2,4-Trimethylpentane		2.80	mg/kg	0.10	112	70	130			
2-Methylpentane		2.71	mg/kg	0.10	108	70	130			
n-Butylcyclohexane		2.56	mg/kg	0.10	103	70	130			
n-Decane		2.42	mg/kg	0.10	97	70	130			
n-Pentane		2.69	mg/kg	0.10	108	70	130			
Methyl tert-butyl ether (MTBE)		2.17	mg/kg	0.10	87	70	130			
Benzene		2.33	mg/kg	0.050	94	70	130			
Toluene		2.31	mg/kg	0.050	93	70	130			
Ethylbenzene		2.34	mg/kg	0.050	94	70	130			
m+p-Xylenes		4.78	mg/kg	0.050	96	70	130			
o-Xylene		2.37	mg/kg	0.050	95	70	130			
Naphthalene		2.40	mg/kg	0.10	96	70	130			
Total Purgeable Hydrocarbons		37.7	mg/kg	2.0	101	70	130			
Surr: VPH Aromatics Surrogate				0.10	103	70	130			
Surr: VPH Aliphatics Surrogate				0.10	115	70	130			
Lab ID: MB-151330	14	Method Blank				Run: PE2_201216A				12/16/20 12:54
Methyl tert-butyl ether (MTBE)		ND	mg/kg	0.10						
Benzene		ND	mg/kg	0.050						
Toluene		ND	mg/kg	0.050						
Ethylbenzene		ND	mg/kg	0.050						
m+p-Xylenes		ND	mg/kg	0.050						
o-Xylene		ND	mg/kg	0.050						
Xylenes, Total		ND	mg/kg	0.050						
Naphthalene		ND	mg/kg	0.10						
C9 to C10 Aromatics		ND	mg/kg	2.0						
C5 to C8 Aliphatics		ND	mg/kg	2.0						
C9 to C12 Aliphatics		ND	mg/kg	2.0						
Total Purgeable Hydrocarbons		ND	mg/kg	2.0						
Surr: VPH Aromatics Surrogate				0.10	101	70	130			
Surr: VPH Aliphatics Surrogate				0.10	109	70	130			
Lab ID: B20121111-001AMS	10	Sample Matrix Spike				Run: PE2_201216A				12/16/20 14:05
Methyl tert-butyl ether (MTBE)		2.45	mg/kg-dry	0.12	80	70	130			
Benzene		2.59	mg/kg-dry	0.061	85	70	130			
Toluene		2.58	mg/kg-dry	0.061	84	70	130			
Ethylbenzene		2.63	mg/kg-dry	0.061	86	70	130			
m+p-Xylenes		5.39	mg/kg-dry	0.061	88	70	130			
o-Xylene		2.66	mg/kg-dry	0.061	87	70	130			
Naphthalene		2.68	mg/kg-dry	0.12	88	70	130			
Total Purgeable Hydrocarbons		41.1	mg/kg-dry	2.5	89	70	130			
Surr: VPH Aromatics Surrogate				0.12	98	70	130			
Surr: VPH Aliphatics Surrogate				0.12	106	70	130			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: MT Dept of Transportation **Work Order:** B20121111 **Report Date:** 12/18/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-VPH										Batch: 151330
Lab ID: B20121111-001AMSD	10	Sample Matrix Spike Duplicate				Run: PE2_201216A				12/16/20 15:18
Methyl tert-butyl ether (MTBE)		2.43	mg/kg-dry	0.12	79	70	130	1.1	20	
Benzene		2.61	mg/kg-dry	0.061	85	70	130	0.5	20	
Toluene		2.62	mg/kg-dry	0.061	86	70	130	1.4	20	
Ethylbenzene		2.67	mg/kg-dry	0.061	87	70	130	1.8	20	
m+p-Xylenes		5.49	mg/kg-dry	0.061	90	70	130	1.8	20	
o-Xylene		2.72	mg/kg-dry	0.061	89	70	130	2.0	20	
Naphthalene		2.69	mg/kg-dry	0.12	88	70	130	0.4	20	
Total Purgeable Hydrocarbons		41.4	mg/kg-dry	2.5	90	70	130	0.9	20	
Surr: VPH Aromatics Surrogate				0.12	97	70	130			
Surr: VPH Aliphatics Surrogate				0.12	101	70	130			
Method: MA-VPH										Analytical Run: R353655
Lab ID: CCV_1216PE201r-S	15	Continuing Calibration Verification Standard								12/16/20 11:07
1,2,4-Trimethylbenzene		2.37	mg/kg	0.10	95	75	125			
2,2,4-Trimethylpentane		2.72	mg/kg	0.10	109	75	125			
2-Methylpentane		2.71	mg/kg	0.10	108	75	125			
n-Butylcyclohexane		2.38	mg/kg	0.10	95	75	125			
n-Decane		2.25	mg/kg	0.10	90	75	125			
n-Pentane		2.79	mg/kg	0.10	111	75	125			
Methyl tert-butyl ether (MTBE)		2.15	mg/kg	0.10	86	75	125			
Benzene		2.35	mg/kg	0.050	94	75	125			
Toluene		2.35	mg/kg	0.050	94	75	125			
Ethylbenzene		2.37	mg/kg	0.050	95	75	125			
m+p-Xylenes		4.81	mg/kg	0.050	96	75	125			
o-Xylene		2.40	mg/kg	0.050	96	75	125			
Naphthalene		2.45	mg/kg	0.10	98	75	125			
Surr: VPH Aromatics Surrogate				0.10	91	75	125			
Surr: VPH Aliphatics Surrogate				0.10	100	75	125			
Lab ID: CCV_1216PE239r-S	15	Continuing Calibration Verification Standard								12/17/20 10:00
1,2,4-Trimethylbenzene		2.31	mg/kg	0.10	93	75	125			
2,2,4-Trimethylpentane		2.71	mg/kg	0.10	108	75	125			
2-Methylpentane		2.66	mg/kg	0.10	106	75	125			
n-Butylcyclohexane		2.40	mg/kg	0.10	96	75	125			
n-Decane		2.35	mg/kg	0.10	94	75	125			
n-Pentane		2.73	mg/kg	0.10	109	75	125			
Methyl tert-butyl ether (MTBE)		2.12	mg/kg	0.10	85	75	125			
Benzene		2.29	mg/kg	0.050	92	75	125			
Toluene		2.28	mg/kg	0.050	91	75	125			
Ethylbenzene		2.31	mg/kg	0.050	92	75	125			
m+p-Xylenes		4.70	mg/kg	0.050	94	75	125			
o-Xylene		2.33	mg/kg	0.050	93	75	125			
Naphthalene		2.38	mg/kg	0.10	95	75	125			
Surr: VPH Aromatics Surrogate				0.10	98	75	125			
Surr: VPH Aliphatics Surrogate				0.10	109	75	125			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

SB1 Batch ID: 151330

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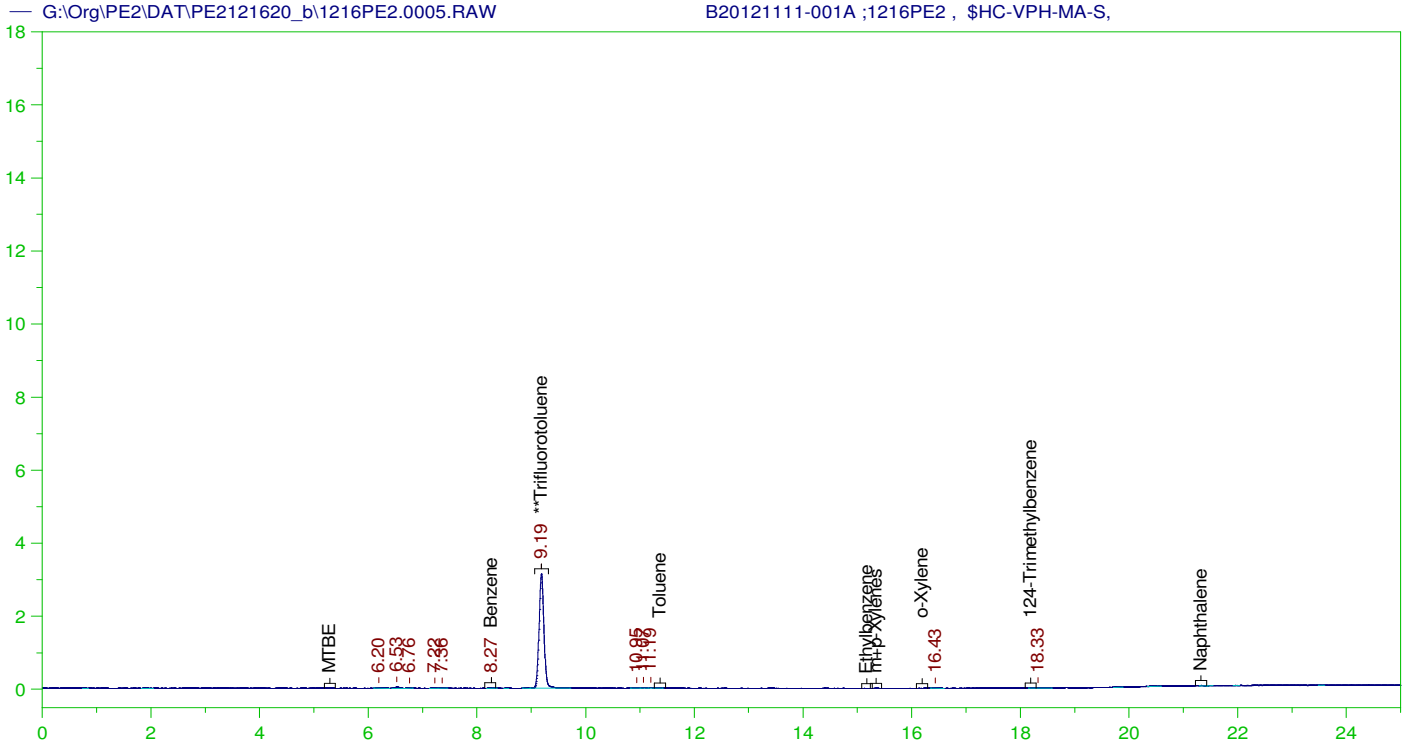

VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-001A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0005.RAW
Date & Time Acquired: 12/16/2020 1:30:07 PM
Method File: G:\Org\PE2\Methods\201111VPH%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:274.9338 C9-C10 Aromatics Amount: 1.165881E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.27	8.27	8.27	94	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	.	.	.		.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.187	2.5	2.347	93.89	70-130

SB1 Batch ID: 151330

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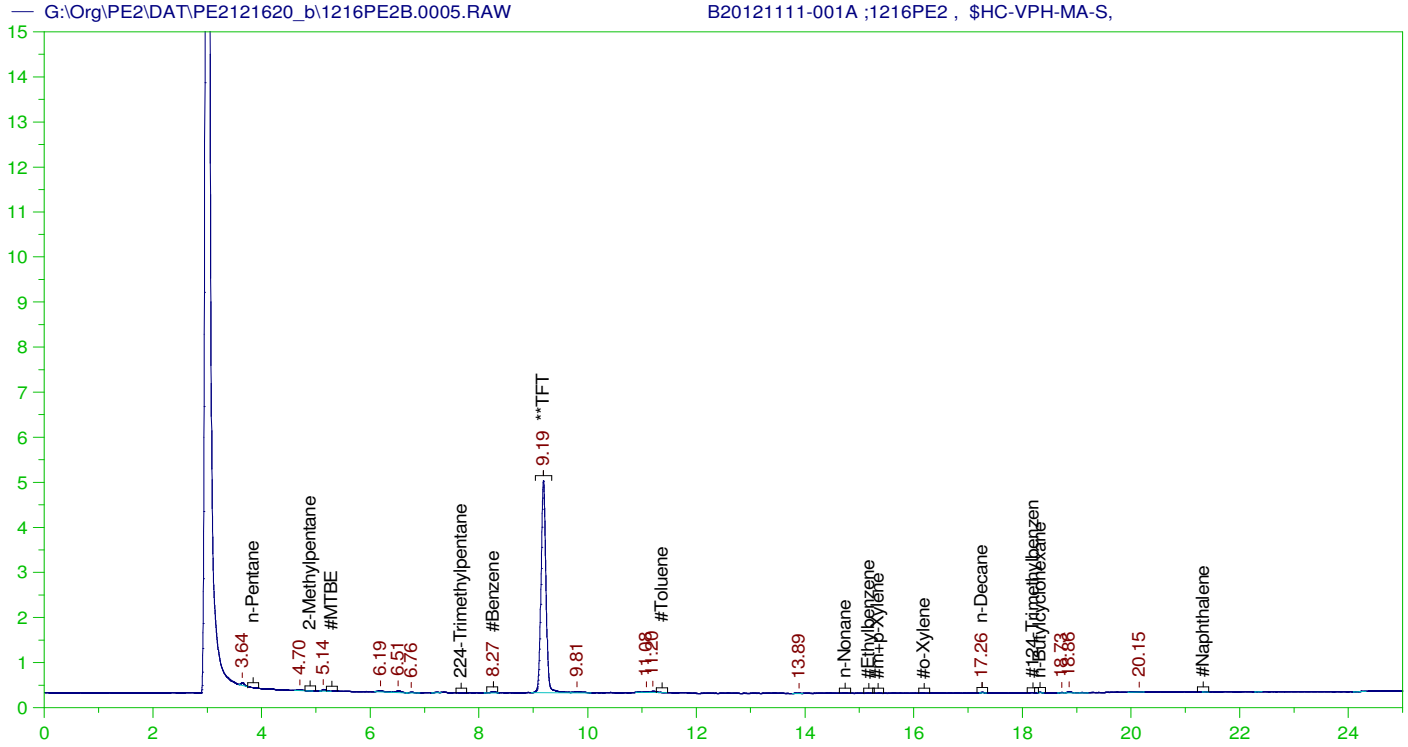

VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-001A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0005.RAW
Date & Time Acquired: 12/16/2020 1:30:07 PM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.187	2.5	2.608	104.34	-

GRO Area:1643.621 GRO Amount: 0.0933326
TPH Area:2455.586 TPH Amount: 0.1394398

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:1723.313 C5-C8 Amount: 0.1068936
C9-C12 Area:404.5525 C9-C12 Amount: 2.678311E-02

SB2 Batch ID: 151330

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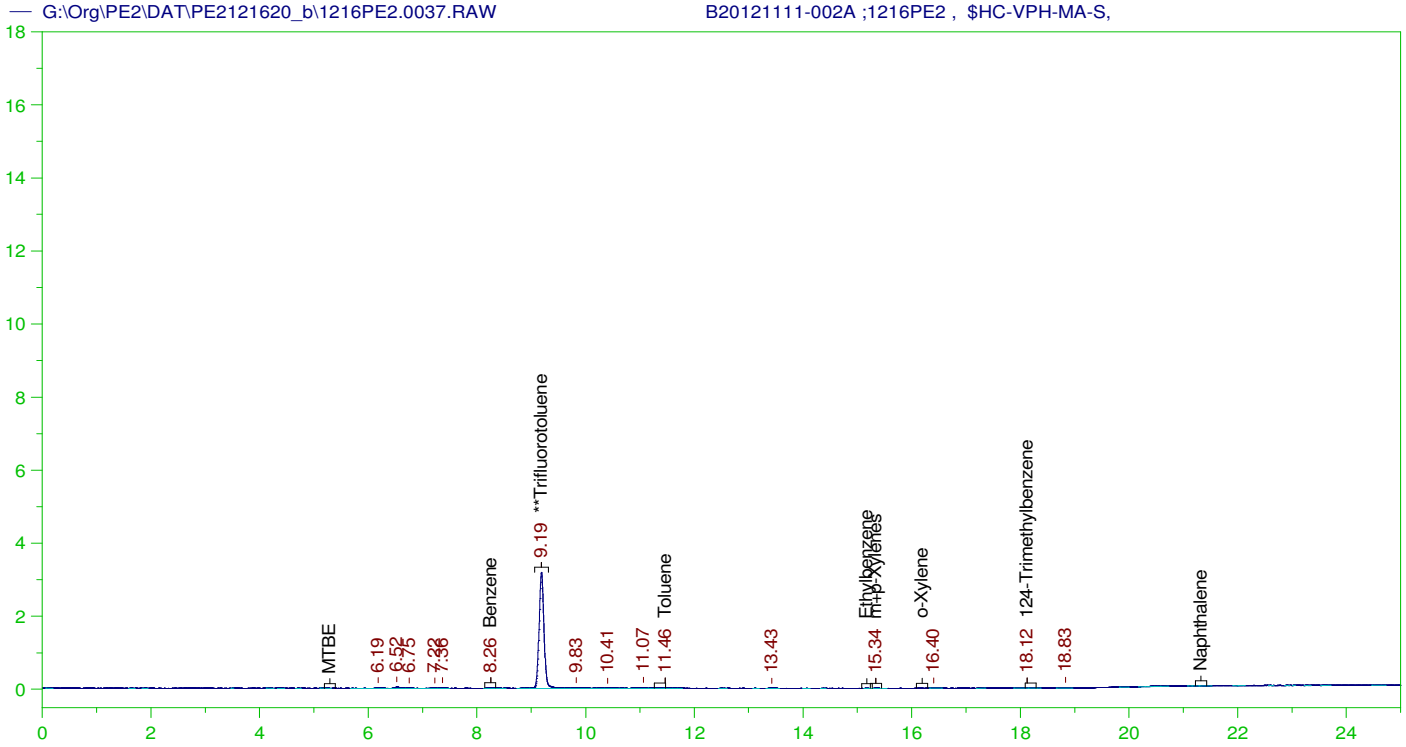

VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-002A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0037.RAW
Date & Time Acquired: 12/17/2020 8:48:58 AM
Method File: G:\Org\PE2\Methods\201111V1111-2%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:435.9271 C9-C10 Aromatics Amount: 1.848587E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.259	8.259	8.259	164	.05	U
Toluene	11.465	11.465	11.465	53	.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	15.34	15.34	15.34	73	.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	18.123	18.123	18.123	59	.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.187	2.5	2.396	95.83	70-130

SB2 Batch ID: 151330

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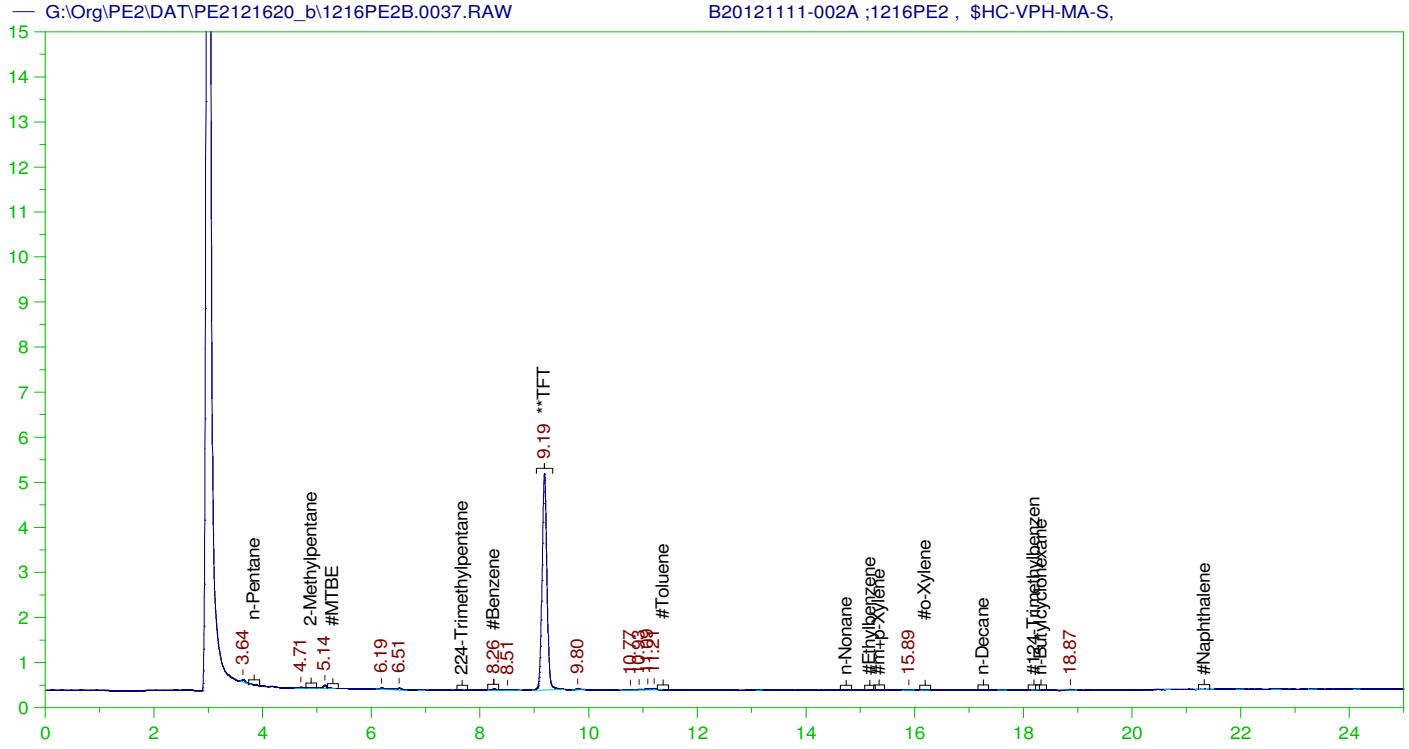

VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-002A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0037.RAW
Date & Time Acquired: 12/17/2020 8:48:58 AM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.188	2.5	2.638	105.53	-

GRO Area:1933.916 GRO Amount: 0.1098169
TPH Area:2713.102 TPH Amount: 0.1540628

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:2070.633 C5-C8 Amount: 0.1284372
C9-C12 Area:231.3467 C9-C12 Amount: 1.531614E-02

SB3 Batch ID: 151330

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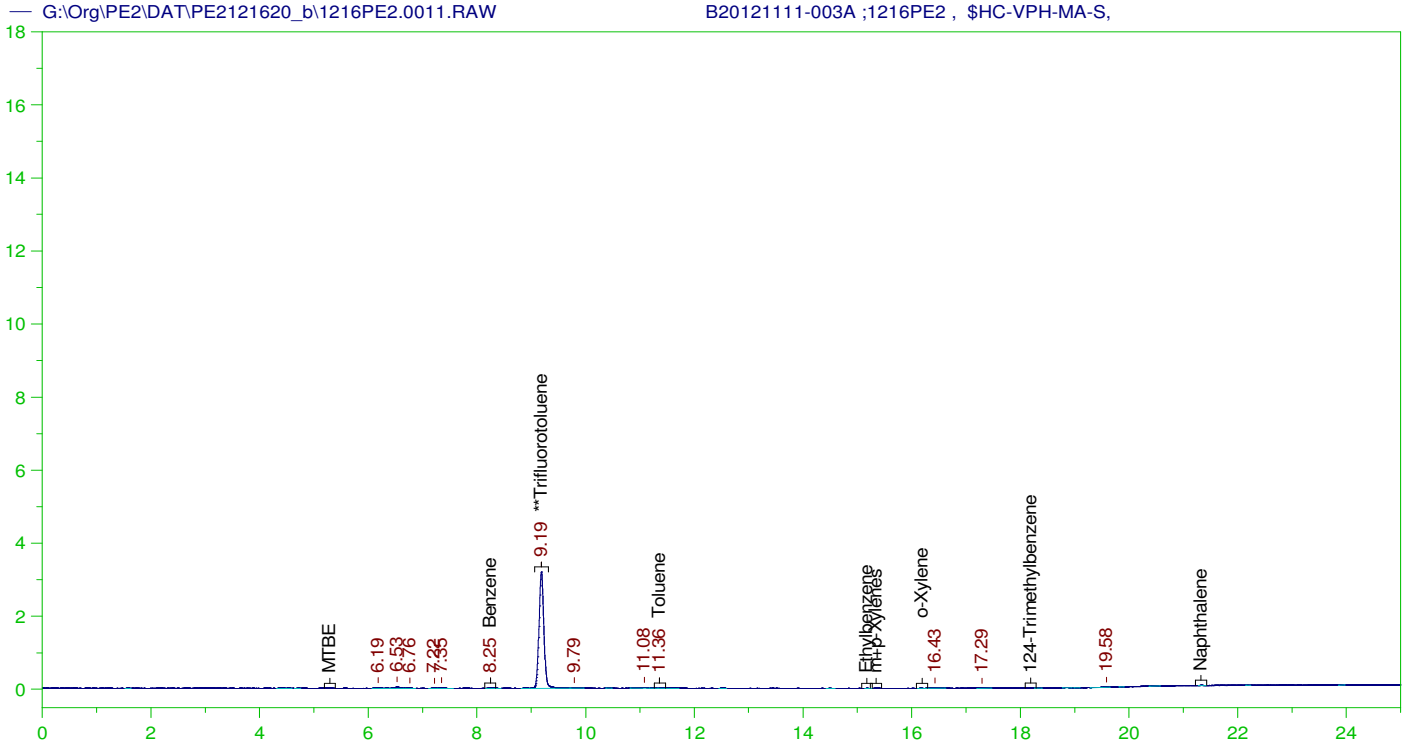

VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-003A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0011.RAW
Date & Time Acquired: 12/16/2020 5:05:55 PM
Method File: G:\Org\PE2\Methods\201111VPH%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:431.6695 C9-C10 Aromatics Amount: 1.830532E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.248	8.248	8.248	138	.05	U
Toluene	11.361	11.361	11.361	132	.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	.	.	.		.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.186	2.5	2.384	95.37	70-130

SB3 Batch ID: 151330

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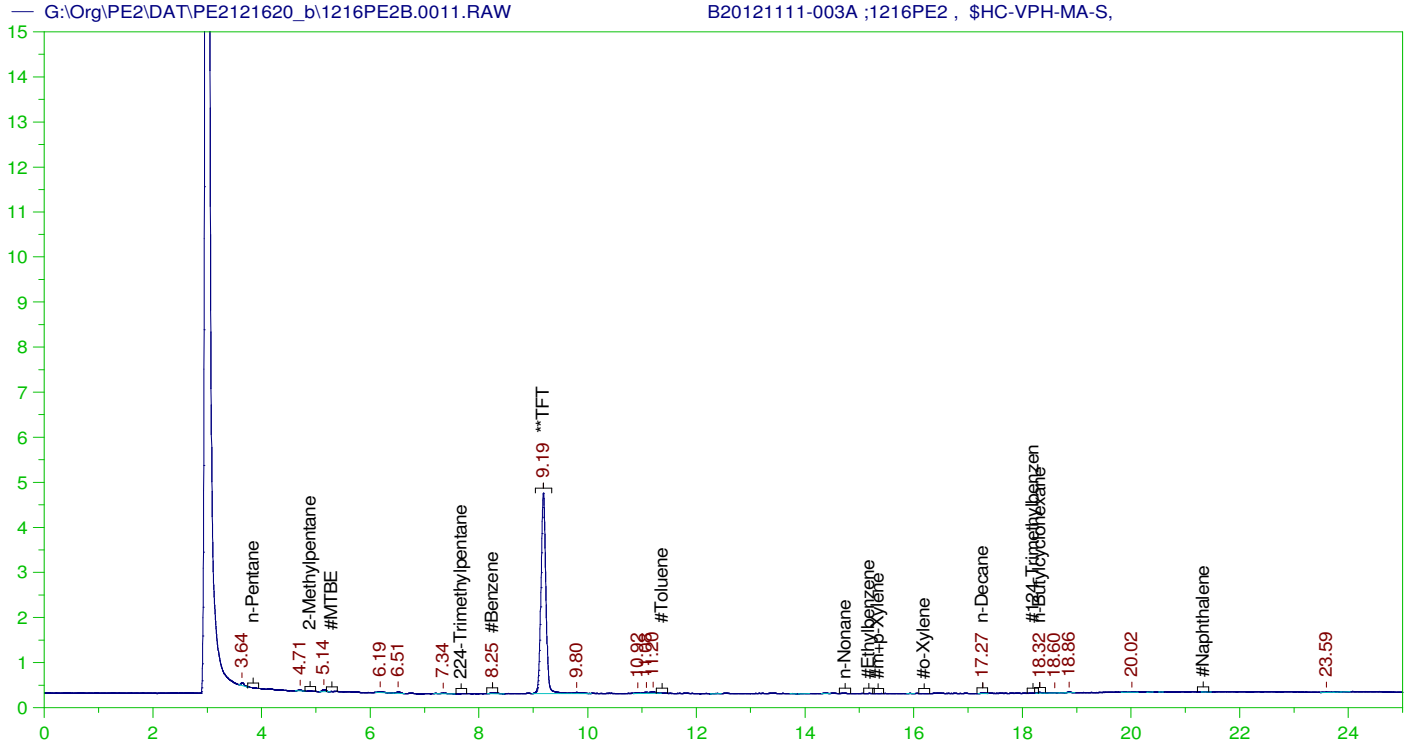

VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-003A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0011.RAW
Date & Time Acquired: 12/16/2020 5:05:55 PM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC
**TFT	9.186	2.5	2.46	98.41	-

GRO Area:1795.236 GRO Amount: 0.101942
TPH Area:2728.693 TPH Amount: 0.1549482

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:1797.236 C5-C8 Amount: 0.1114789
C9-C12 Area:514.2419 C9-C12 Amount: 3.404501E-02

SB4 Batch ID: 151330

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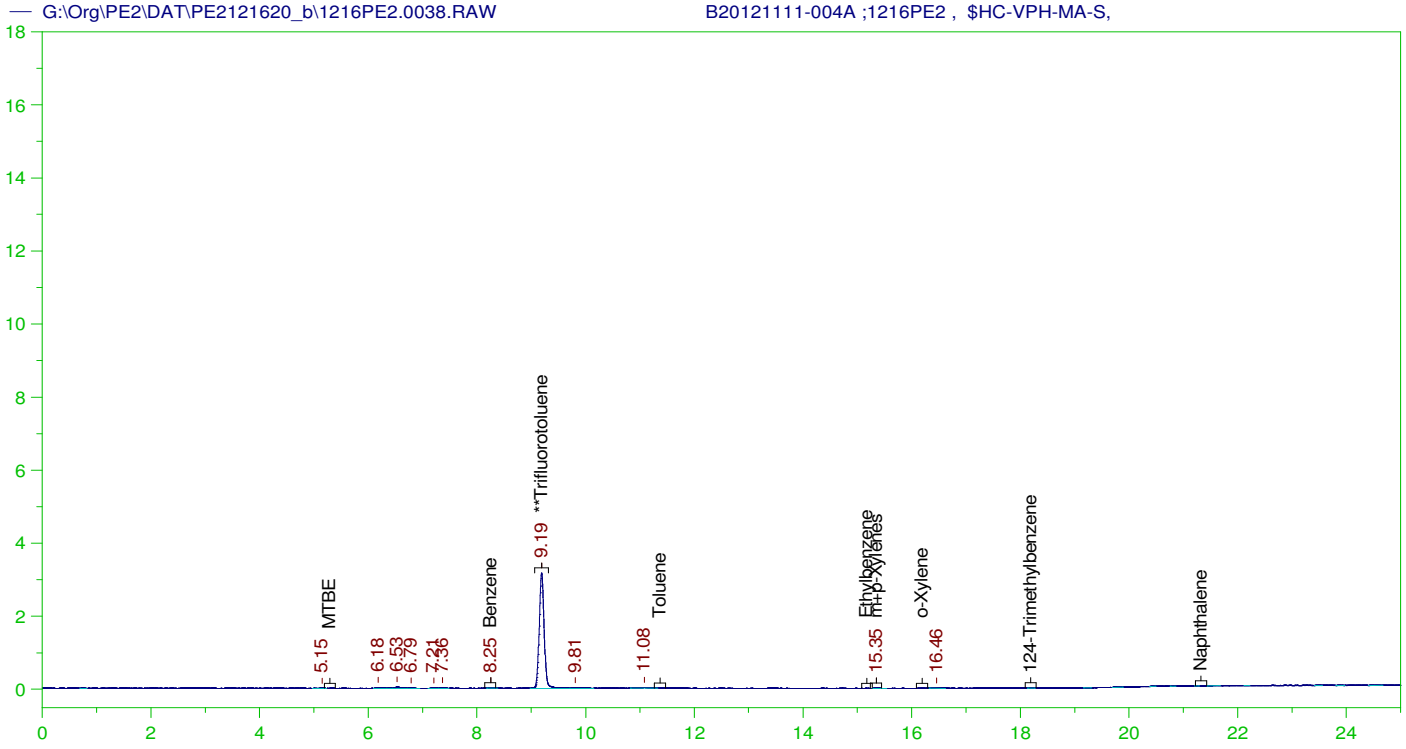


VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-004A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0038.RAW
Date & Time Acquired: 12/17/2020 9:25:06 AM
Method File: G:\Org\PE2\Methods\201111VPH%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

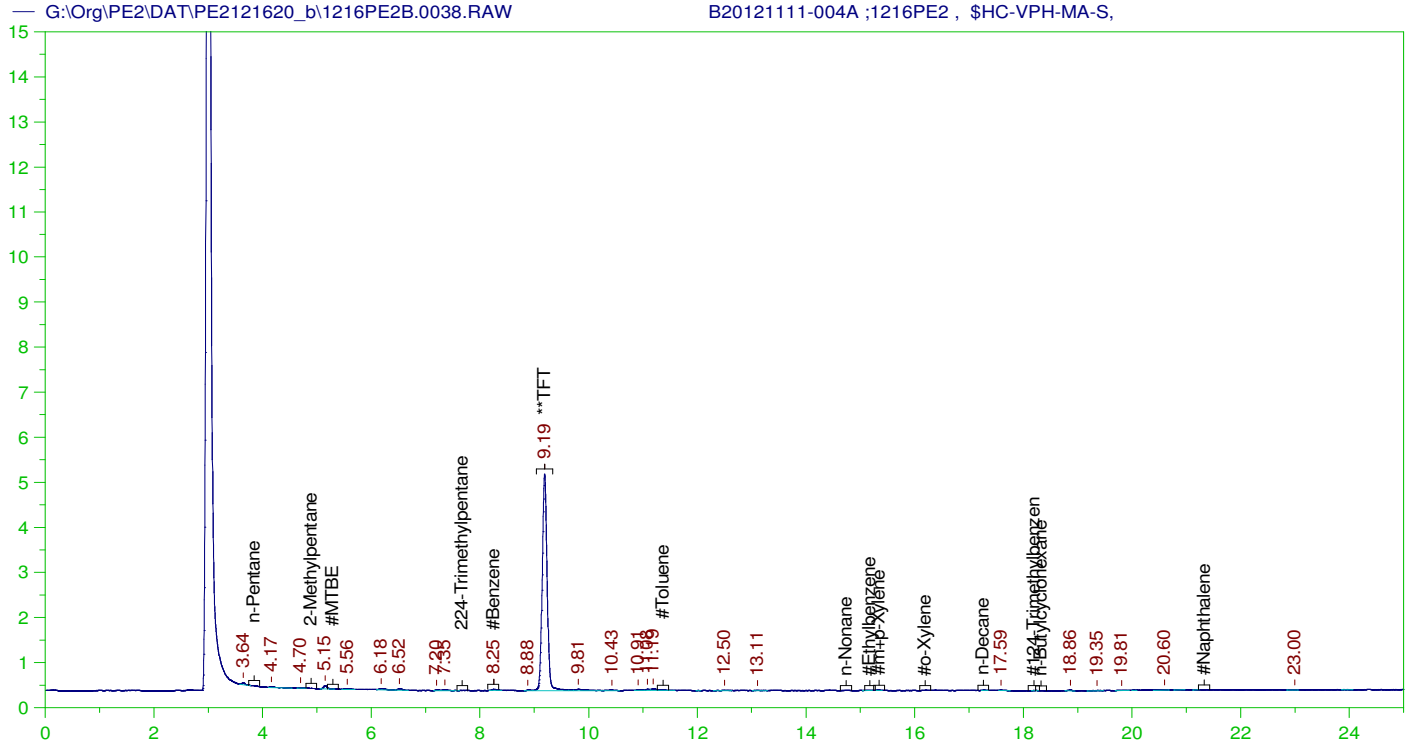
Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:238.9246 C9-C10 Aromatics Amount: 1.013181E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.254	8.254	8.254	95	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	15.351	15.351	15.351	92	.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.19	2.5	2.388	95.51	70-130

SB4 Batch ID: 151330

G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0038.RAW B20121111-004A ;1216PE2 , $HC-VPH-MA-S,



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-004A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0038.RAW
Date & Time Acquired: 12/17/2020 9:25:06 AM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.191	2.5	2.666	106.63	-

GRO Area:2554.215 GRO Amount: 0.1450404
TPH Area:3523.938 TPH Amount: 0.2001059

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:2746.57 C5-C8 Amount: 0.1703642
C9-C12 Area:508.1348 C9-C12 Amount: 0.0336407

SB5 Batch ID: 151330

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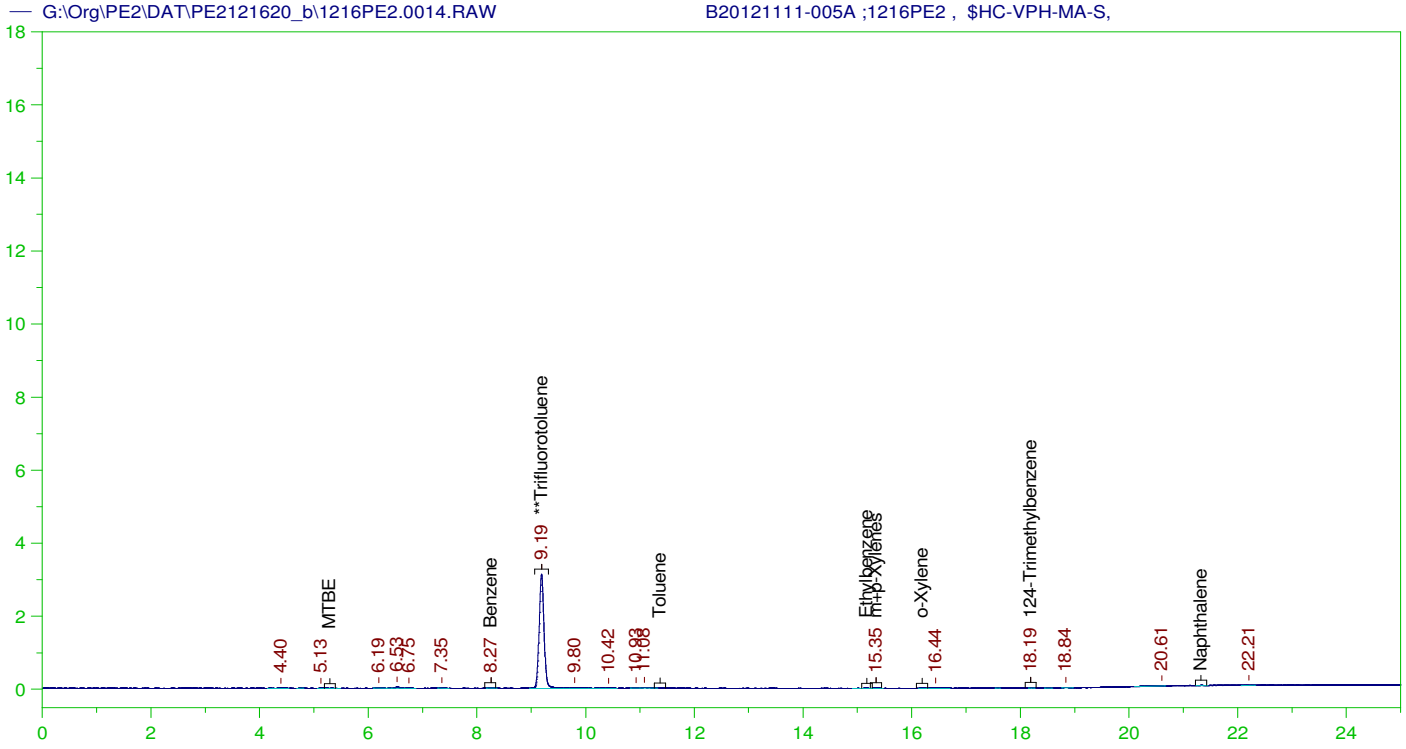

VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-005A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0014.RAW
Date & Time Acquired: 12/16/2020 6:54:01 PM
Method File: G:\Org\PE2\Methods\201111VPH%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:477.9224 C9-C10 Aromatics Amount: 2.026672E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.265	8.265	8.265	97	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	15.347	15.347	15.347	148	.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	18.192	18.192	18.192	59	.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.189	2.5	2.352	94.06	70-130

SB5 Batch ID: 151330

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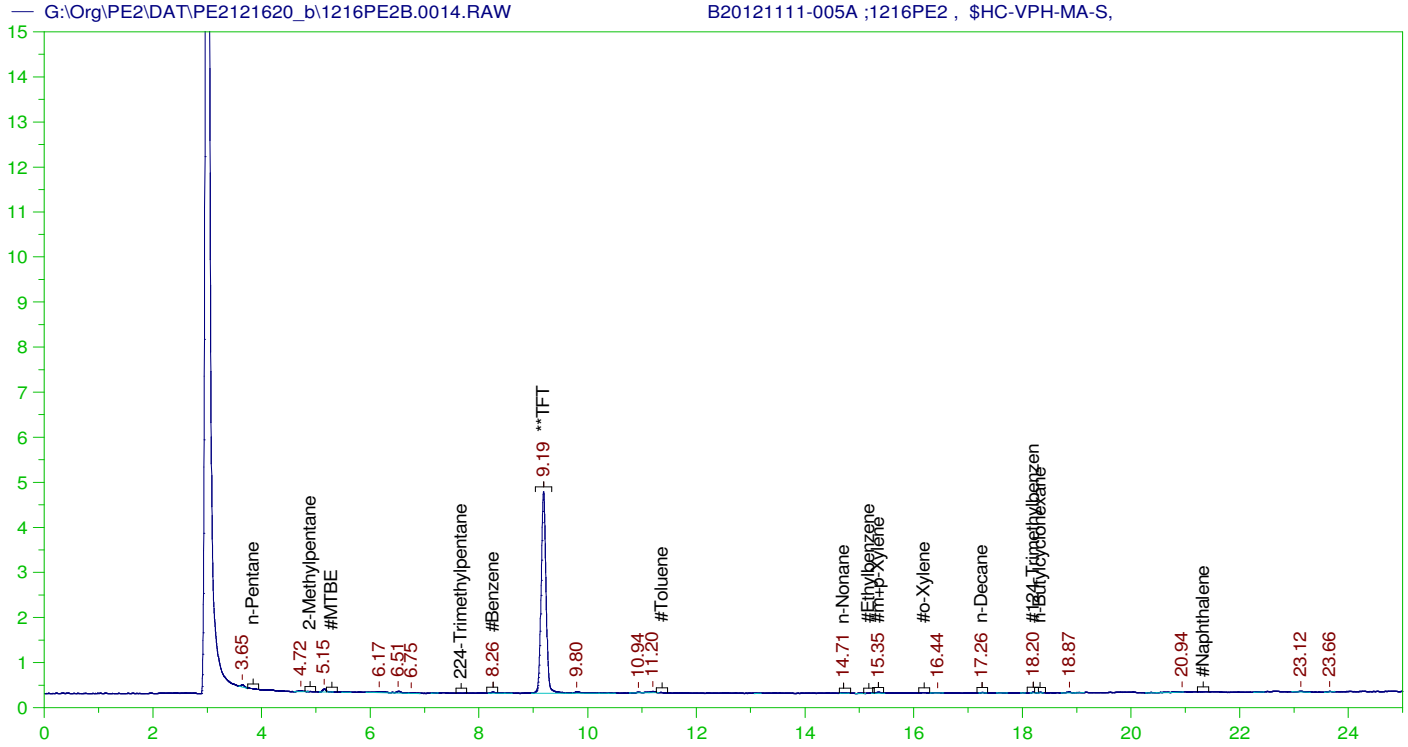

VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-005A ;1216PE2 , $HC-VPH-MA-S,
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Date & Time Acquired: 12/16/2020 6:54:01 PM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.189	2.5	2.469	98.77	-

GRO Area:2189.73 GRO Amount: 0.1243433
TPH Area:3171.756 TPH Amount: 0.1801073

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:1891.797 C5-C8 Amount: 0.1173443
C9-C12 Area:821.3918 C9-C12 Amount: 5.437965E-02

SB6 Batch ID: 151330

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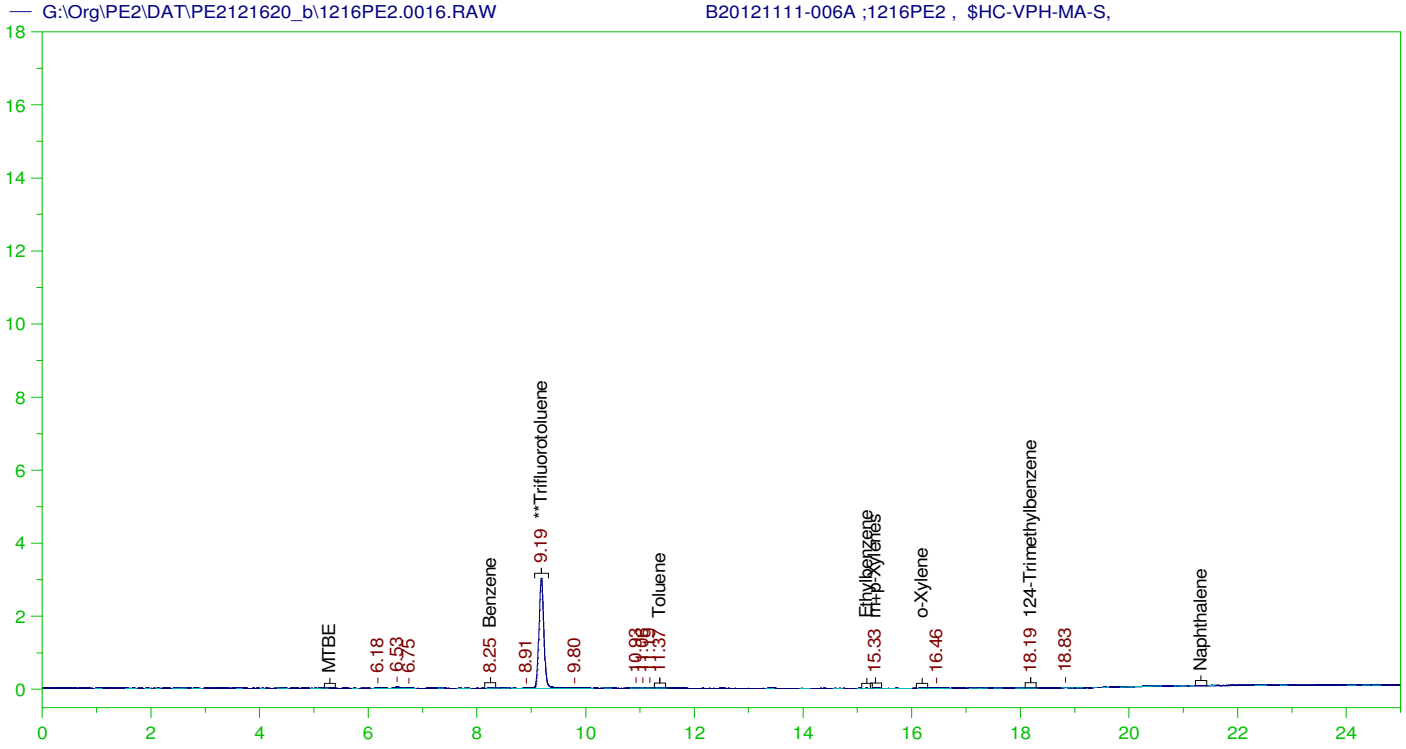

VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-006A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0016.RAW
Date & Time Acquired: 12/16/2020 8:05:57 PM
Method File: G:\Org\PE2\Methods\201111V1111-6%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:607.2934 C9-C10 Aromatics Amount: 2.575281E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.25	8.25	8.25	99	.05	U
Toluene	11.366	11.366	11.366	88	.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	15.329	15.329	15.329	150	.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	18.192	18.192	18.192	56	.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.186	2.5	2.28	91.18	70-130

SB6 Batch ID: 151330

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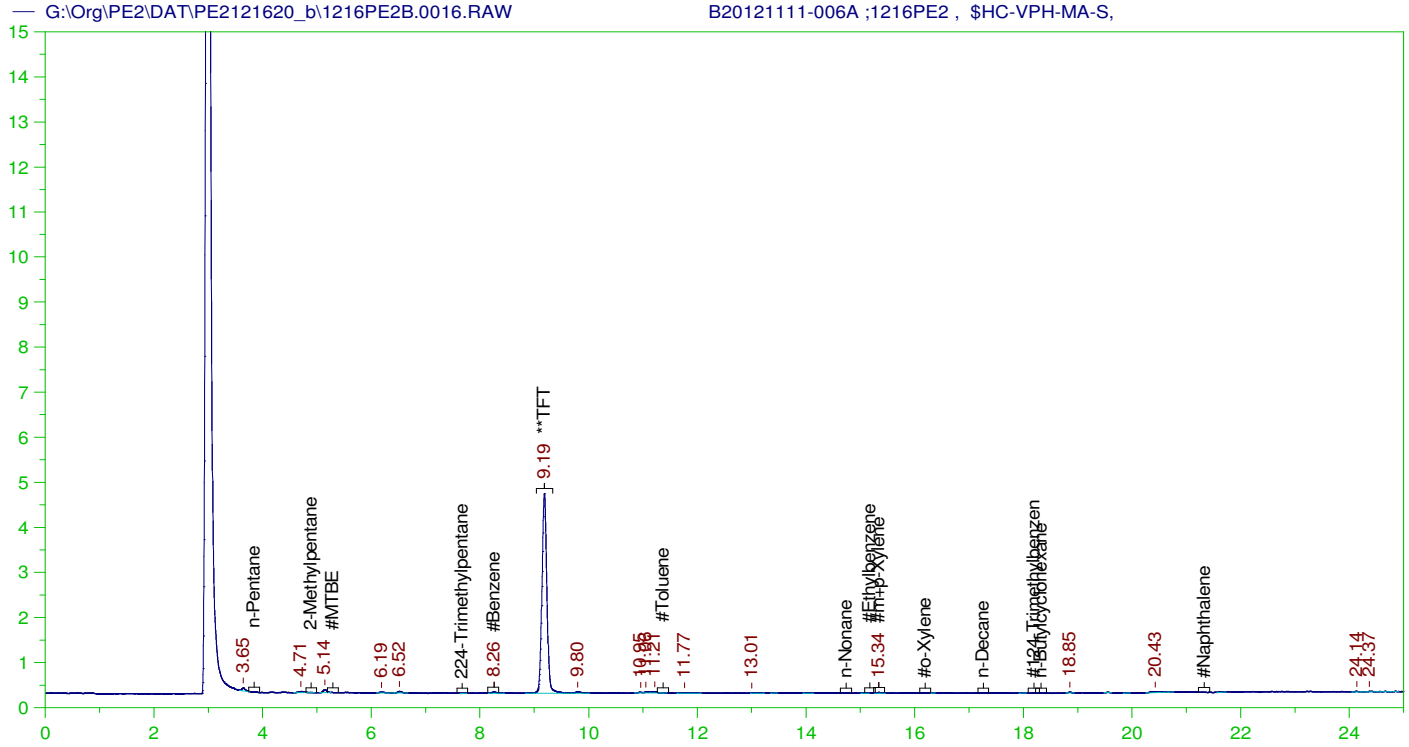

VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-006A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0016.RAW
Date & Time Acquired: 12/16/2020 8:05:57 PM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.186	2.5	2.453	98.1	-

GRO Area:1935.07 GRO Amount: 0.1098825
TPH Area:2926.365 TPH Amount: 0.1661729

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:1986.188 C5-C8 Amount: 0.1231992
C9-C12 Area:436.0373 C9-C12 Amount: 2.886754E-02

SB7 Batch ID: 151330

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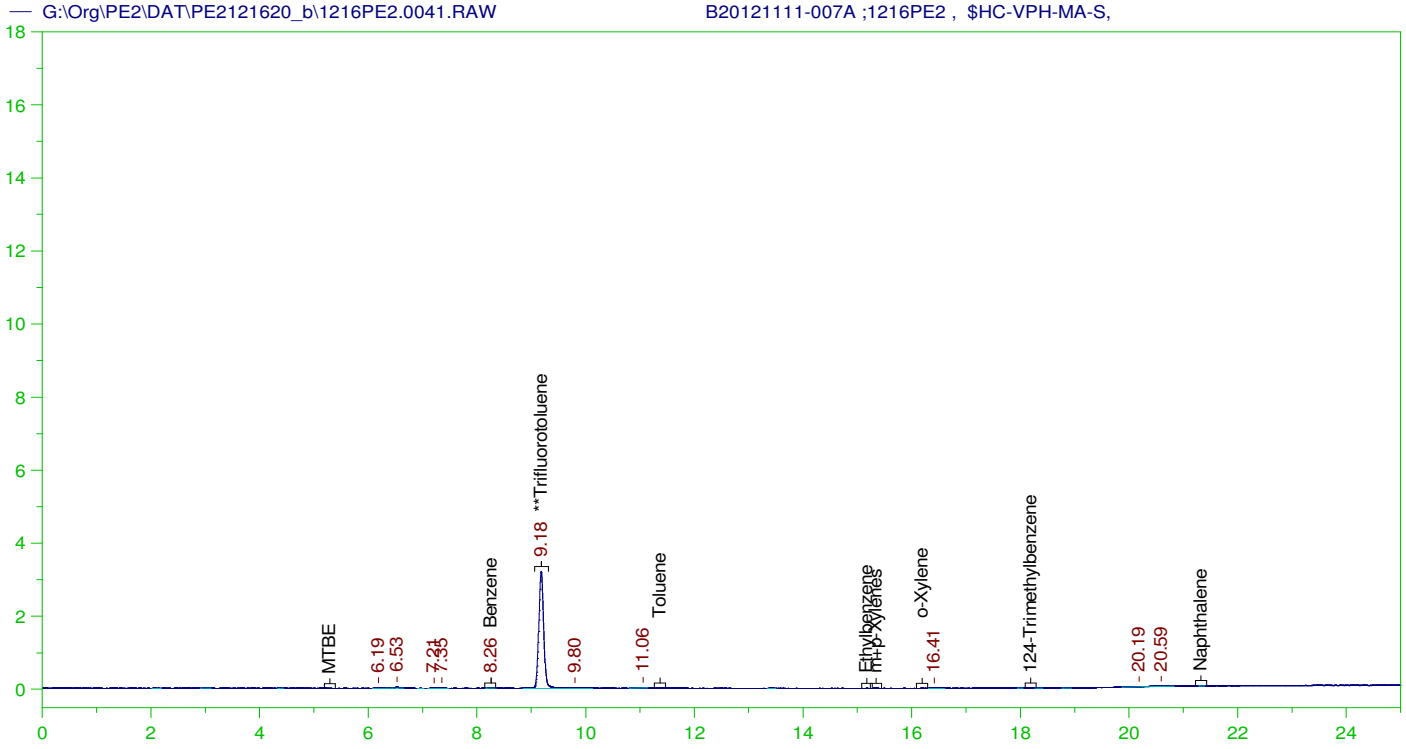


VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-007A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0041.RAW
Date & Time Acquired: 12/17/2020 11:12:19 AM
Method File: G:\Org\PE2\Methods\201111VPH%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

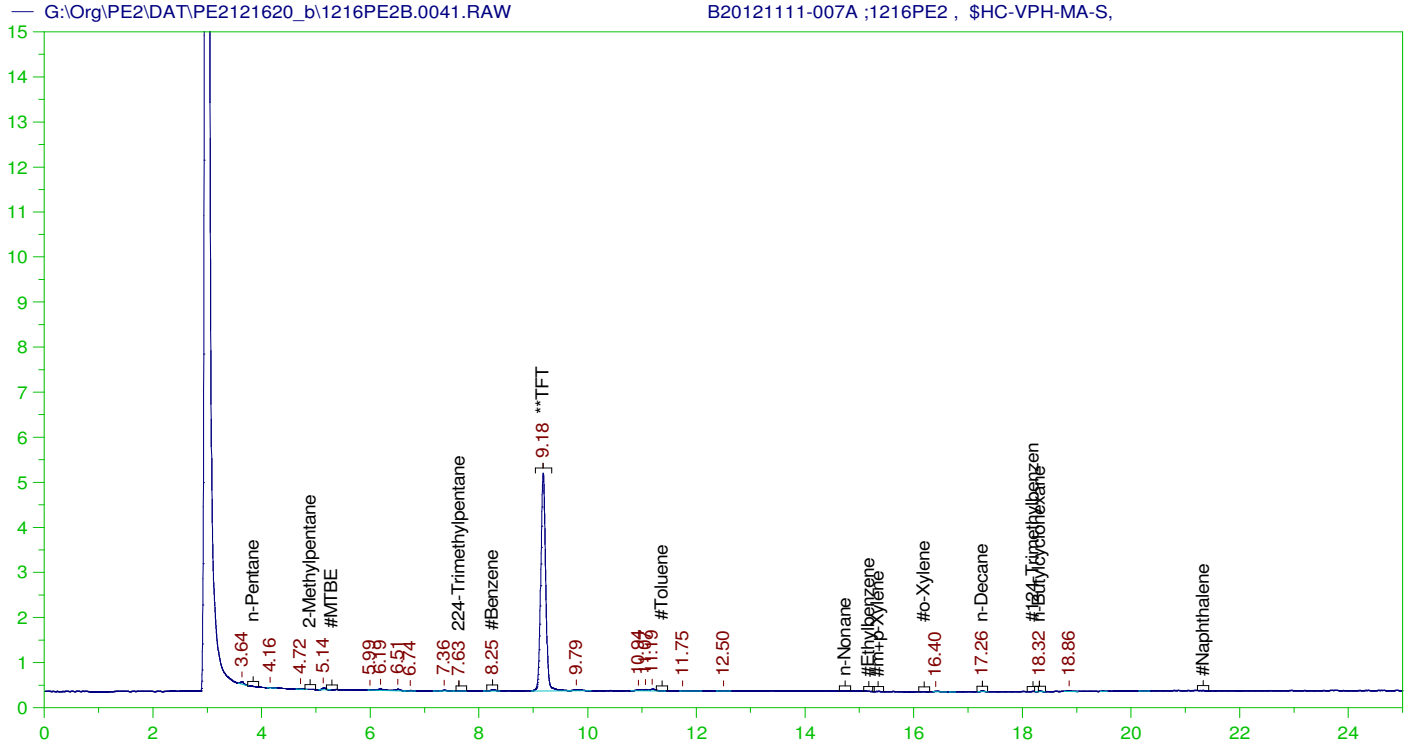
Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:480.4996 C9-C10 Aromatics Amount: 2.037601E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.26	8.26	8.26	81	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	.	.	.		.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.182	2.5	2.413	96.52	70-130

SB7 Batch ID: 151330

G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0041.RAW B20121111-007A ;1216PE2 , $HC-VPH-MA-S,



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-007A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0041.RAW
Date & Time Acquired: 12/17/2020 11:12:19 AM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC
**TFT	9.182	2.5	2.67	106.79 -

GRO Area:2299.146 GRO Amount: 0.1305564
TPH Area:2901.561 TPH Amount: 0.1647644

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:2286.498 C5-C8 Amount: 0.1418269
C9-C12 Area:370.3834 C9-C12 Amount: 2.452097E-02

SB8 Batch ID: 151330

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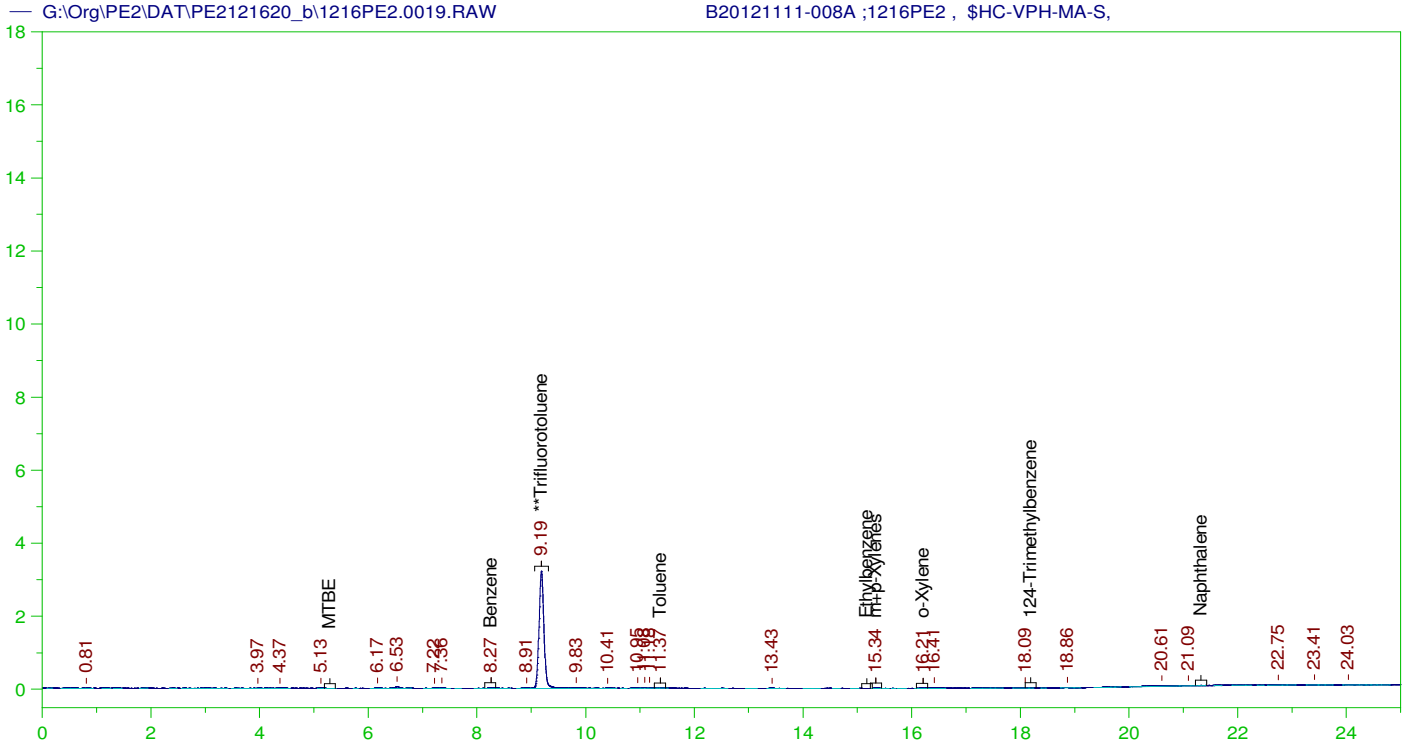

VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-008A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0019.RAW
Date & Time Acquired: 12/16/2020 9:53:39 PM
Method File: G:\Org\PE2\Methods\201111V1111-8%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:1007.755 C9-C10 Aromatics Amount: 4.273473E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.266	8.266	8.266	170	.05	U
Toluene	11.374	11.374	11.374	58	.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	15.339	15.339	15.339	101	.05	U
o-Xylene	16.208	16.208	16.208	58	.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.187	2.5	2.43	97.19	70-130

SB8 Batch ID: 151330

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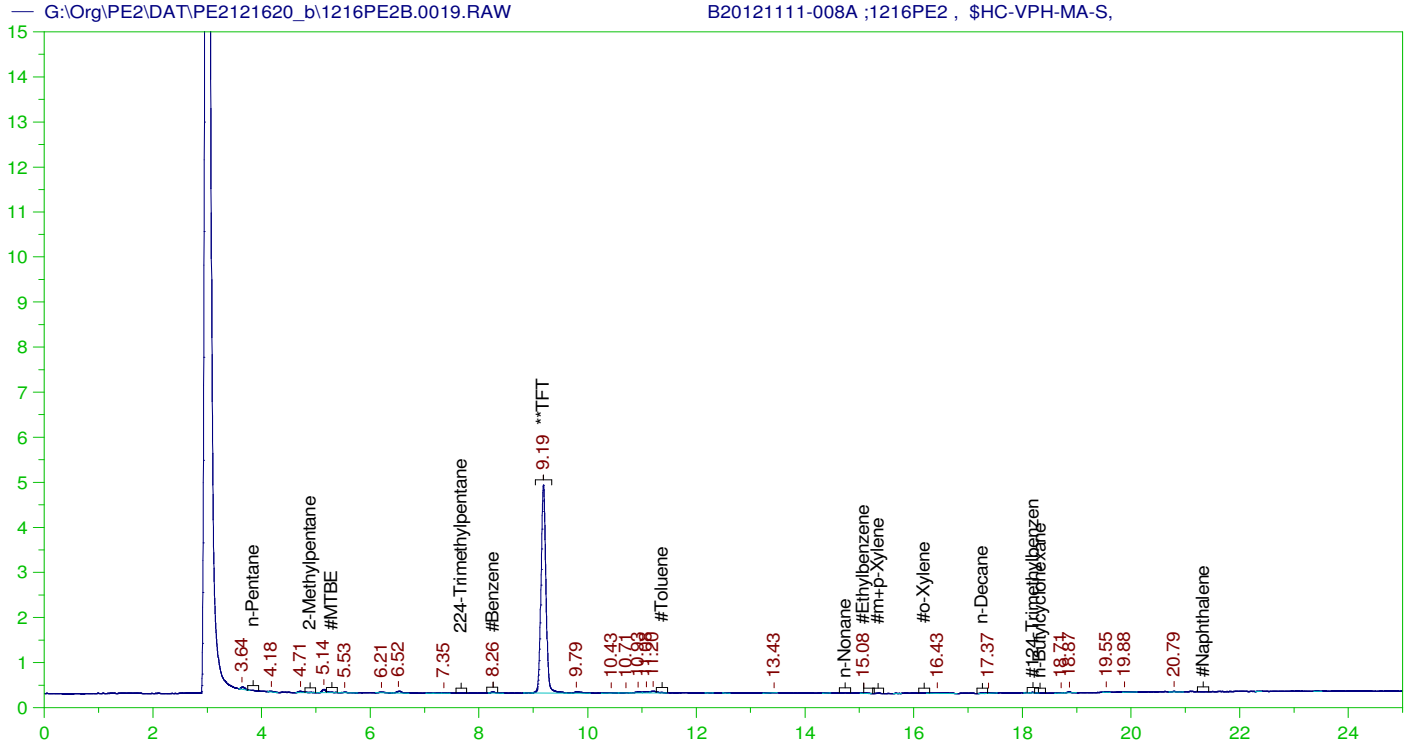

VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-008A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0019.RAW
Date & Time Acquired: 12/16/2020 9:53:39 PM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.187	2.5	2.563	102.52	-

GRO Area:2890.256 GRO Amount: 0.1641224
TPH Area:3951.848 TPH Amount: 0.2244047

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:2732.912 C5-C8 Amount: 0.169517
C9-C12 Area:890.4712 C9-C12 Amount: 0.058953

SB9 Batch ID: 151330

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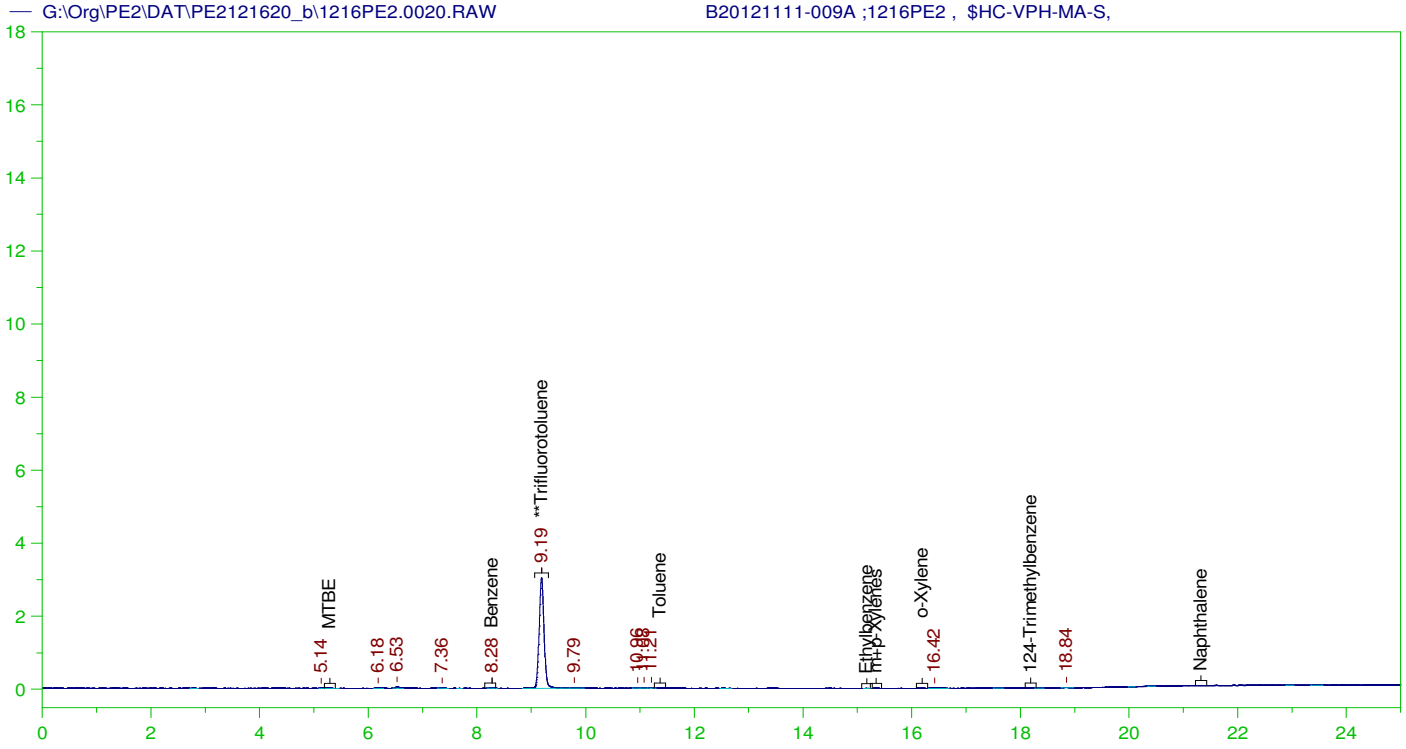

VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-009A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0020.RAW
Date & Time Acquired: 12/16/2020 10:29:48 PM
Method File: G:\Org\PE2\Methods\201111VPH%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:354.3333 C9-C10 Aromatics Amount: 1.502581E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.282	8.282	8.282	87	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	.	.	.		.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.189	2.5	2.265	90.62	70-130

SB9 Batch ID: 151330

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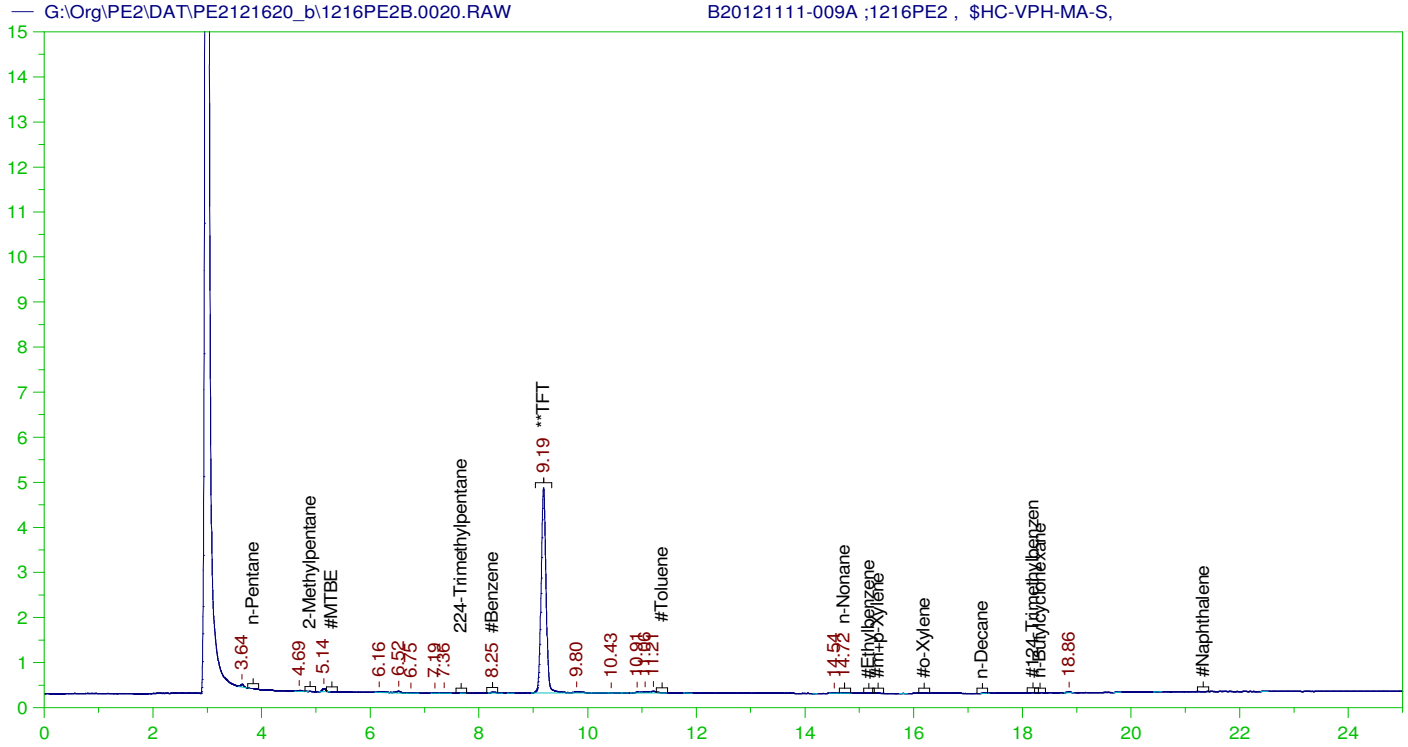

VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-009A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0020.RAW
Date & Time Acquired: 12/16/2020 10:29:48 PM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.189	2.5	2.532	101.27	-

GRO Area:2349.73 GRO Amount: 0.1334288
TPH Area:2880.576 TPH Amount: 0.1635728

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:2337.99 C5-C8 Amount: 0.1450208
C9-C12 Area:250.0074 C9-C12 Amount: 1.655156E-02

SB10 Batch ID: 151330

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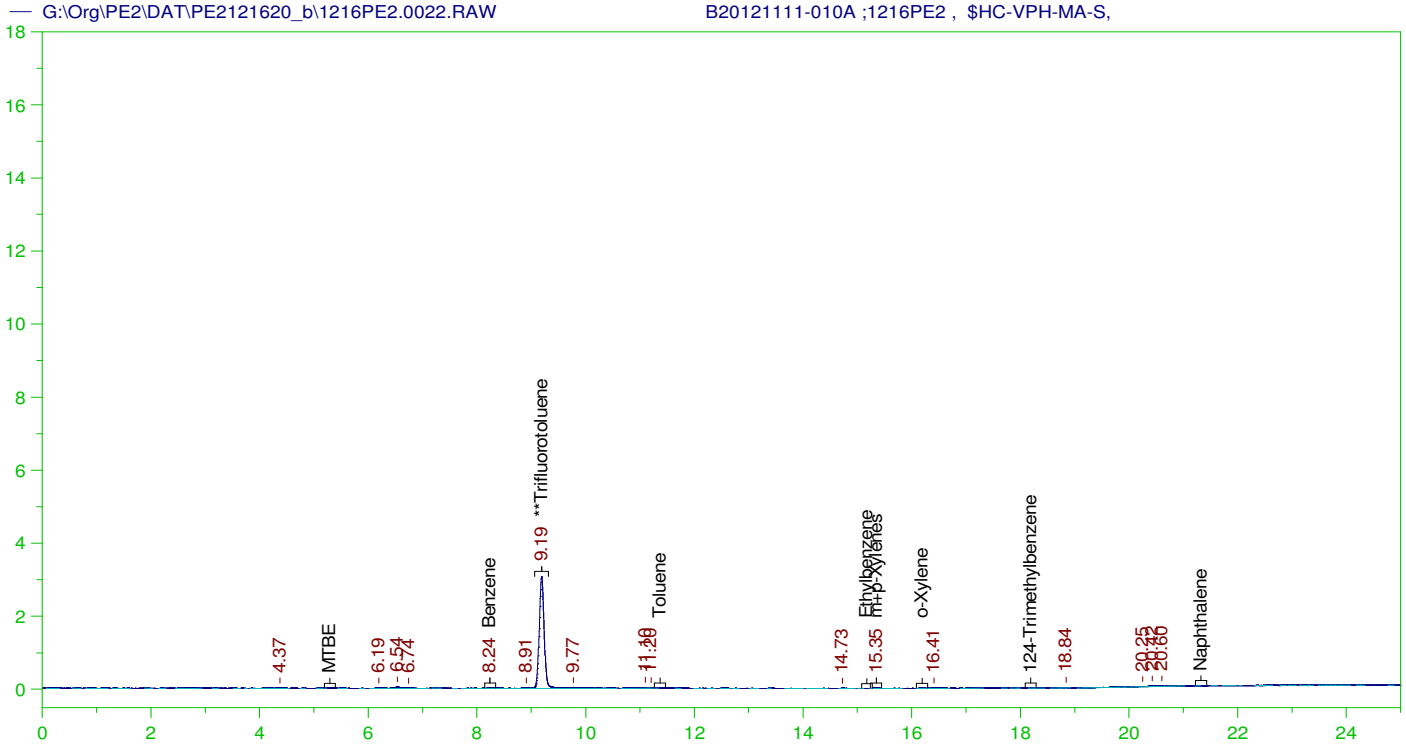

VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-010A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0022.RAW
Date & Time Acquired: 12/16/2020 11:41:15 PM
Method File: G:\Org\PE2\Methods\201111V1111-10%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:809.2992 C9-C10 Aromatics Amount: 3.431904E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.241	8.241	8.241	180	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	15.349	15.349	15.349	127	.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.191	2.5	2.315	92.6	70-130

SB10 Batch ID: 151330

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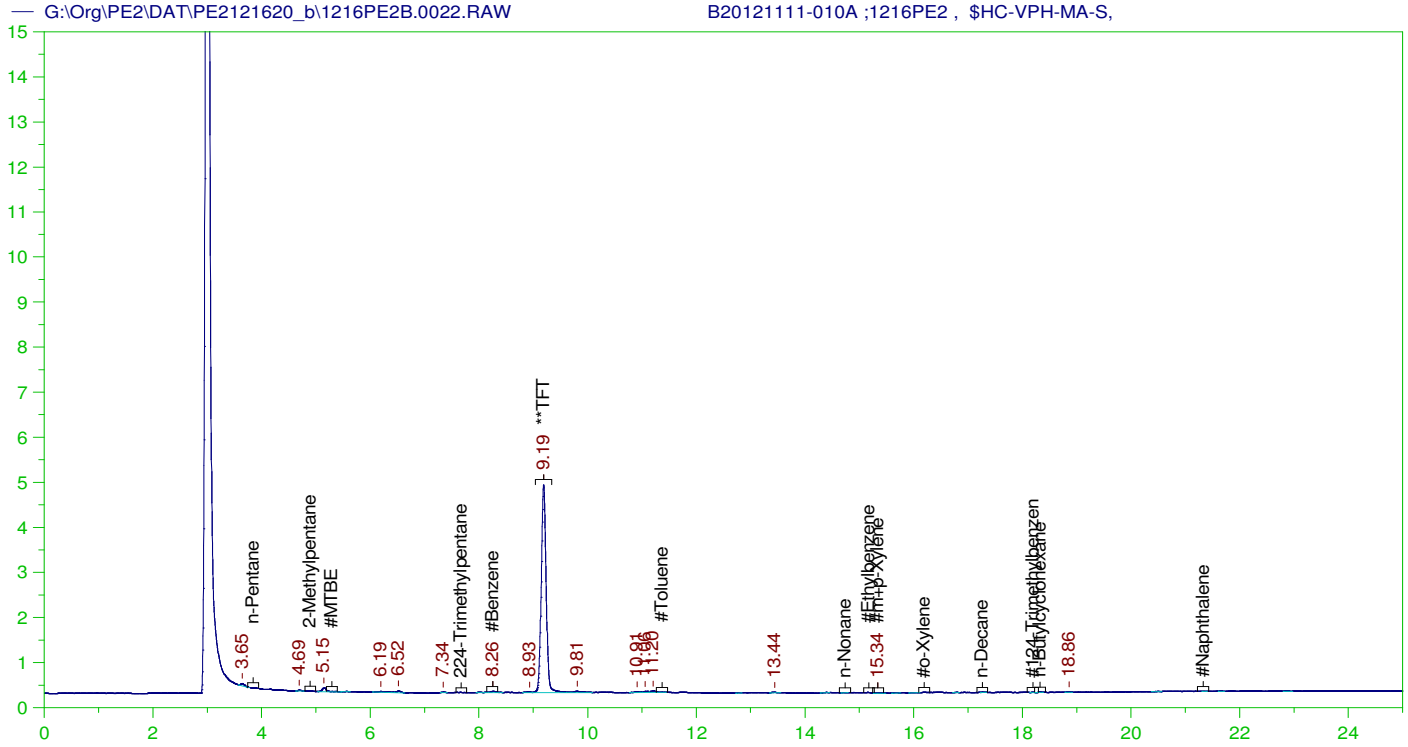


VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-010A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0022.RAW
Date & Time Acquired: 12/16/2020 11:41:15 PM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

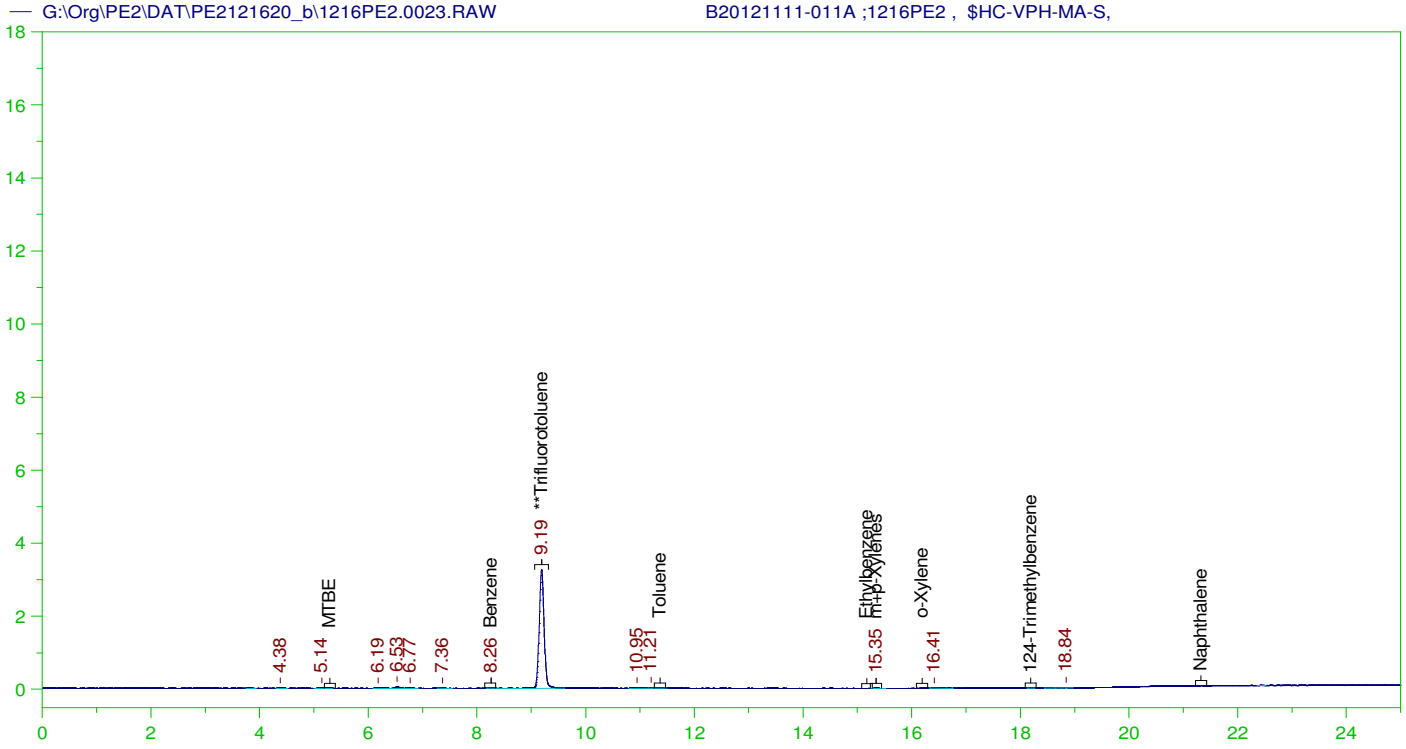
SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC
**TFT	9.191	2.5	2.55	102.01 -

GRO Area:2397.213 GRO Amount: 0.1361251
TPH Area:2944.734 TPH Amount: 0.167216

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:2259.314 C5-C8 Amount: 0.1401407
C9-C12 Area:368.2921 C9-C12 Amount: 2.438251E-02

SB11 Batch ID: 151330

G:\Org\PE2\DAT\PE2121620_b\1216PE2.0023.RAW B20121111-011A ;1216PE2 , $HC-VPH-MA-S,



VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-011A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0023.RAW
Date & Time Acquired: 12/17/2020 12:16:59 AM
Method File: G:\Org\PE2\Methods\201111VPH%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:247.5213 C9-C10 Aromatics Amount: 1.049636E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.261	8.261	8.261	116	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	15.347	15.347	15.347	60	.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.19	2.5	2.424	96.95	70-130

SB11 Batch ID: 151330

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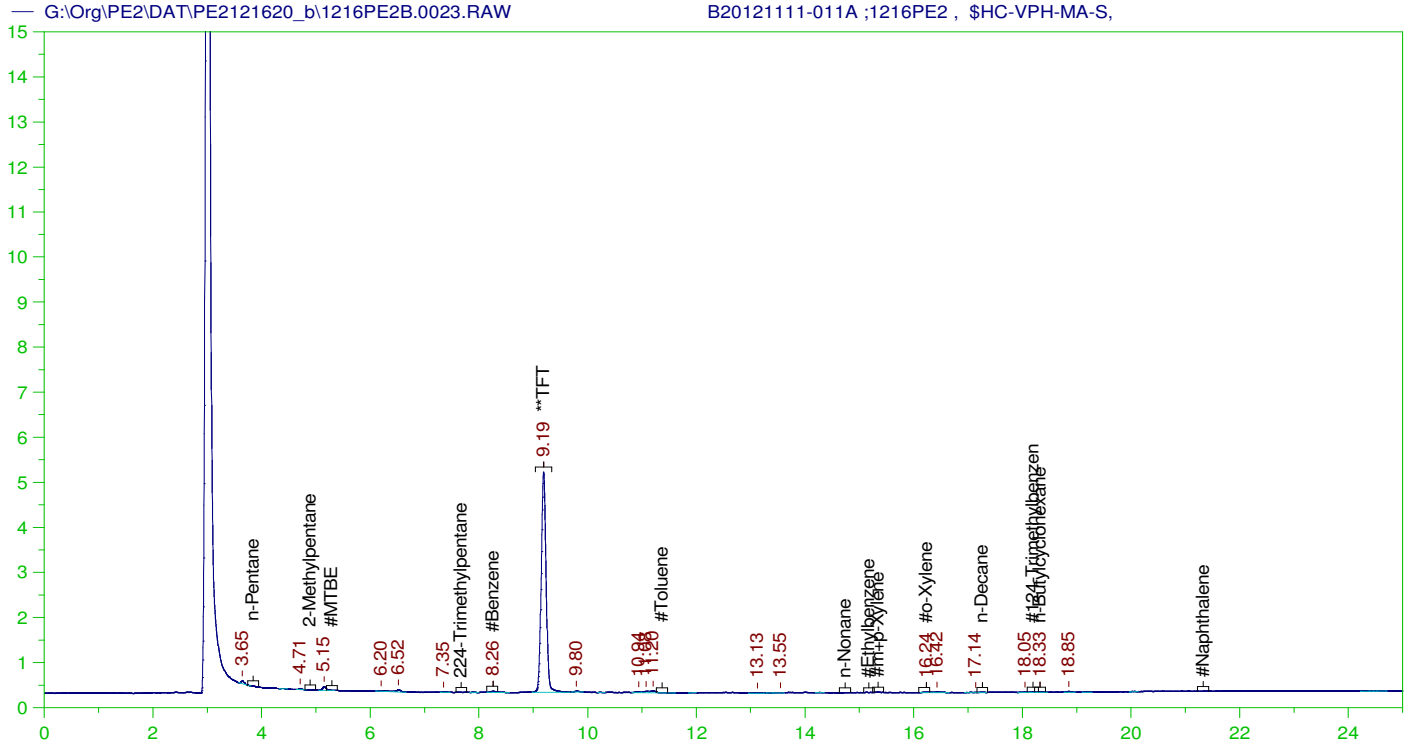

VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-011A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0023.RAW
Date & Time Acquired: 12/17/2020 12:16:59 AM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.191	2.5	2.696	107.84	-

GRO Area:2359.164 GRO Amount: 0.1339645
TPH Area:3096.477 TPH Amount: 0.1758326

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:2164.992 C5-C8 Amount: 0.1342901
C9-C12 Area:573.9782 C9-C12 Amount: 3.799981E-02

SB12 Batch ID: 151330

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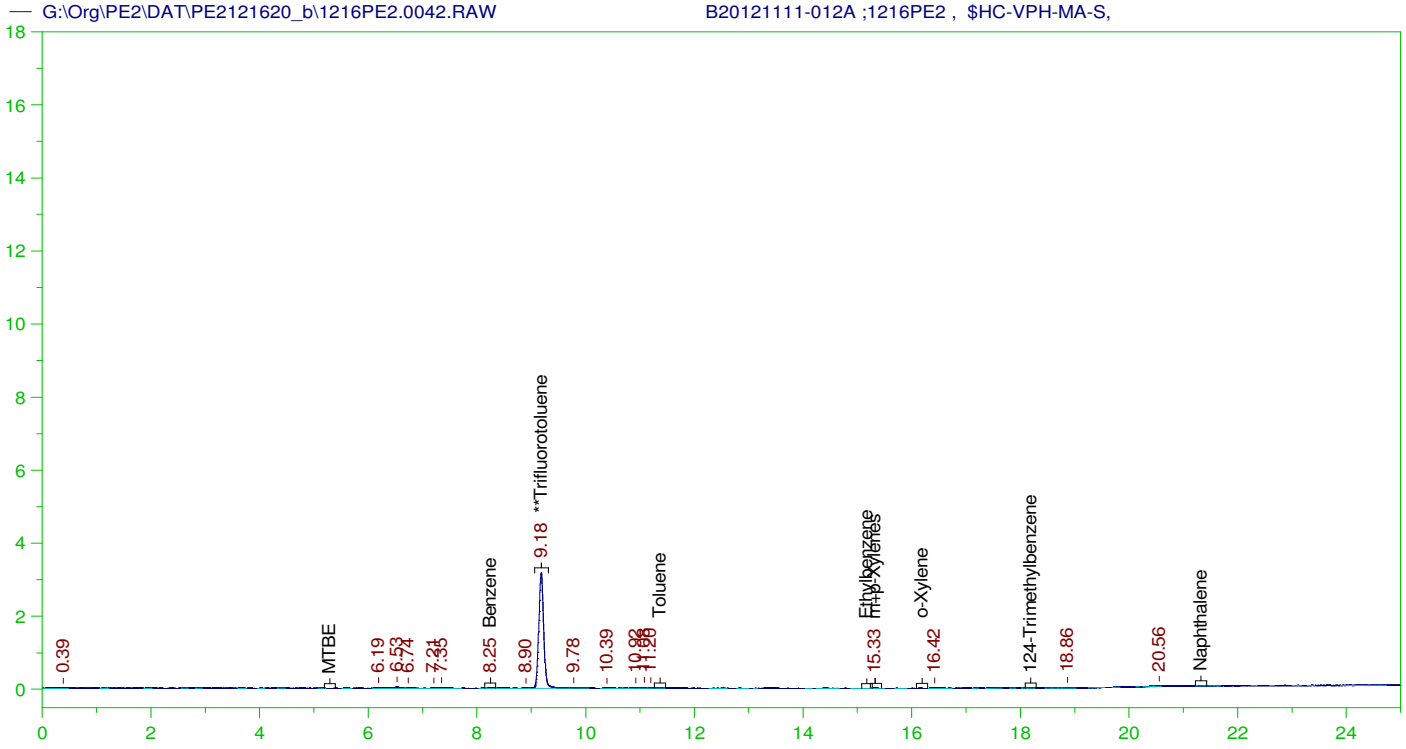

VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-012A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0042.RAW
Date & Time Acquired: 12/17/2020 11:48:06 AM
Method File: G:\Org\PE2\Methods\201111V1111-12%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:531.8365 C9-C10 Aromatics Amount: 0.022553

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.251	8.251	8.251	120	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	15.328	15.328	15.328	81	.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.183	2.5	2.401	96.06	70-130

SB12 Batch ID: 151330

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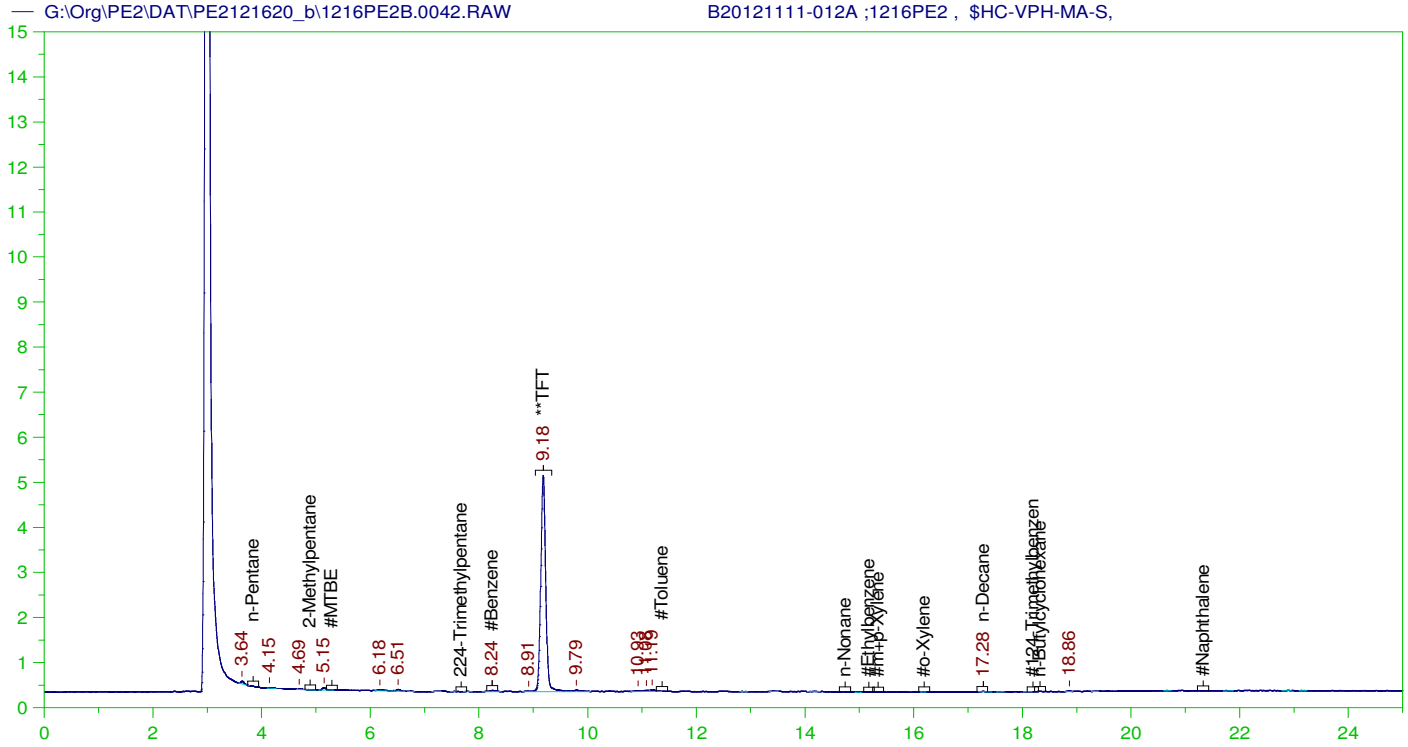

VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-012A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0042.RAW
Date & Time Acquired: 12/17/2020 11:48:06 AM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.183	2.5	2.672	106.86	-

GRO Area:2109.205 GRO Amount: 0.1197707
TPH Area:2781.818 TPH Amount: 0.1579648

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:2172.447 C5-C8 Amount: 0.1347525
C9-C12 Area:249.4714 C9-C12 Amount: 1.651607E-02

SB13 Batch ID: 151330

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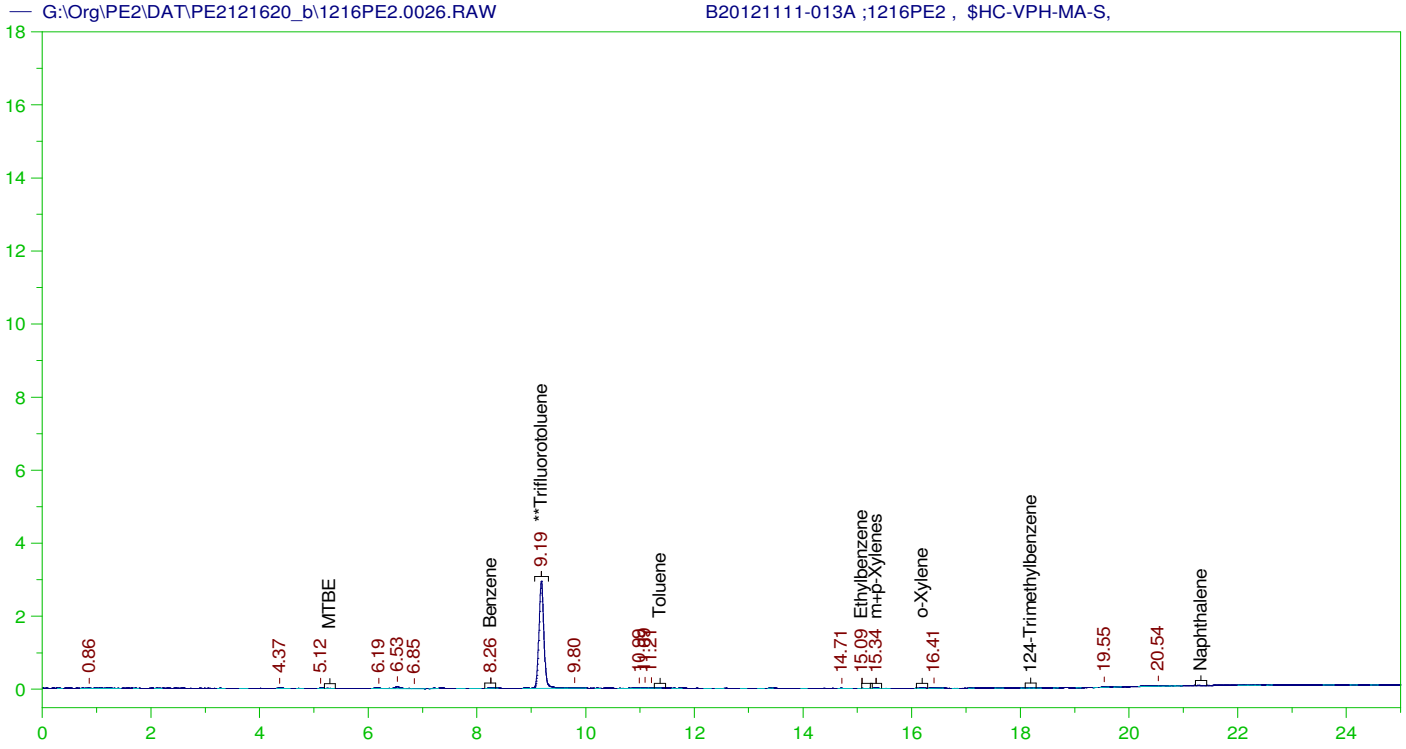


VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-013A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0026.RAW
Date & Time Acquired: 12/17/2020 2:04:35 AM
Method File: G:\Org\PE2\Methods\201111V1111-13%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

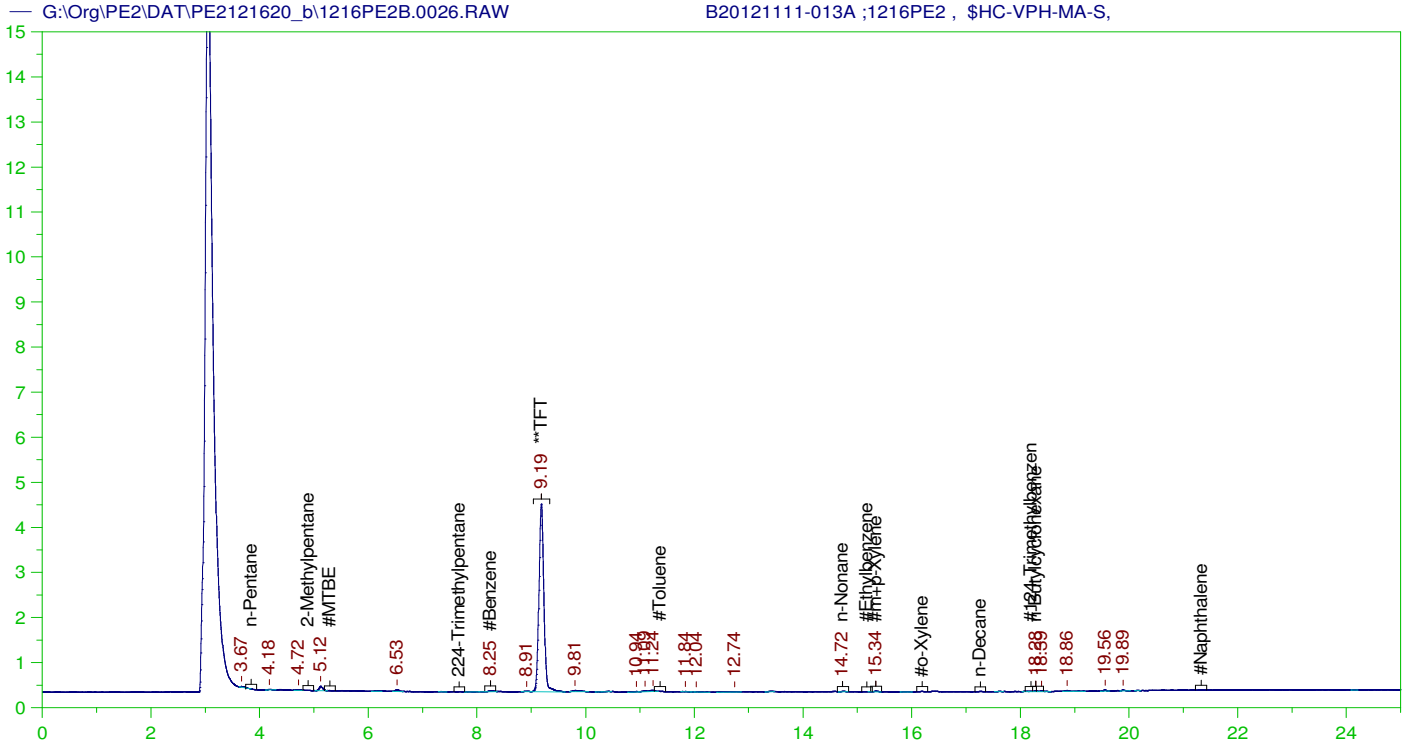
Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:613.0123 C9-C10 Aromatics Amount: 2.599532E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.255	8.255	8.255	73	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	15.085	15.085	15.085	68	.05	U
m+p-Xylenes	15.342	15.342	15.342	98	.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.186	2.5	2.216	88.63	70-130

SB13 Batch ID: 151330

G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0026.RAW B20121111-013A ;1216PE2 , $HC-VPH-MA-S,



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-013A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0026.RAW
Date & Time Acquired: 12/17/2020 2:04:35 AM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.186	2.5	2.314	92.58	-

GRO Area:2094.441 GRO Amount: 0.1189323
TPH Area:2847.168 TPH Amount: 0.1616757

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:2015.789 C5-C8 Amount: 0.1250353
C9-C12 Area:653.9307 C9-C12 Amount: 4.329301E-02

SB14 Batch ID: 151330

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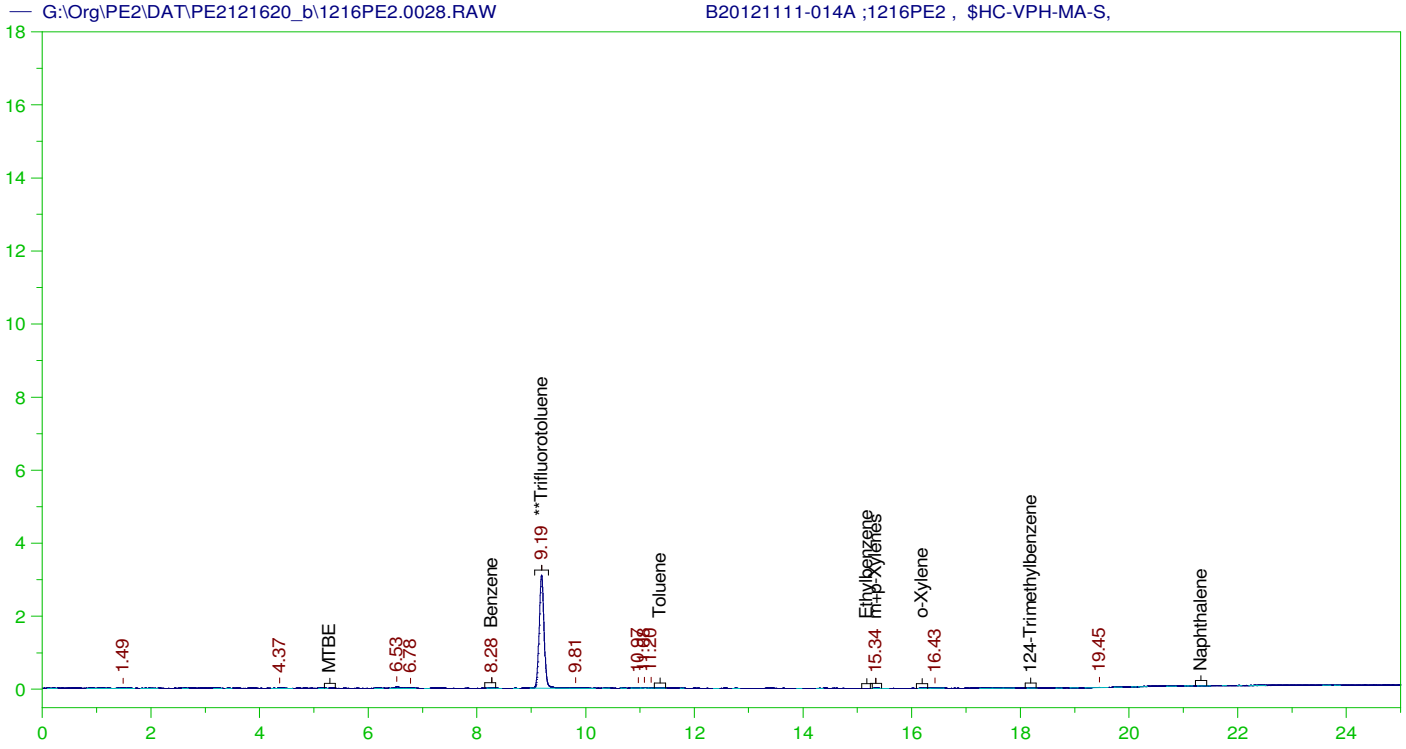


VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-014A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0028.RAW
Date & Time Acquired: 12/17/2020 3:16:06 AM
Method File: G:\Org\PE2\Methods\201111V1111-14%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

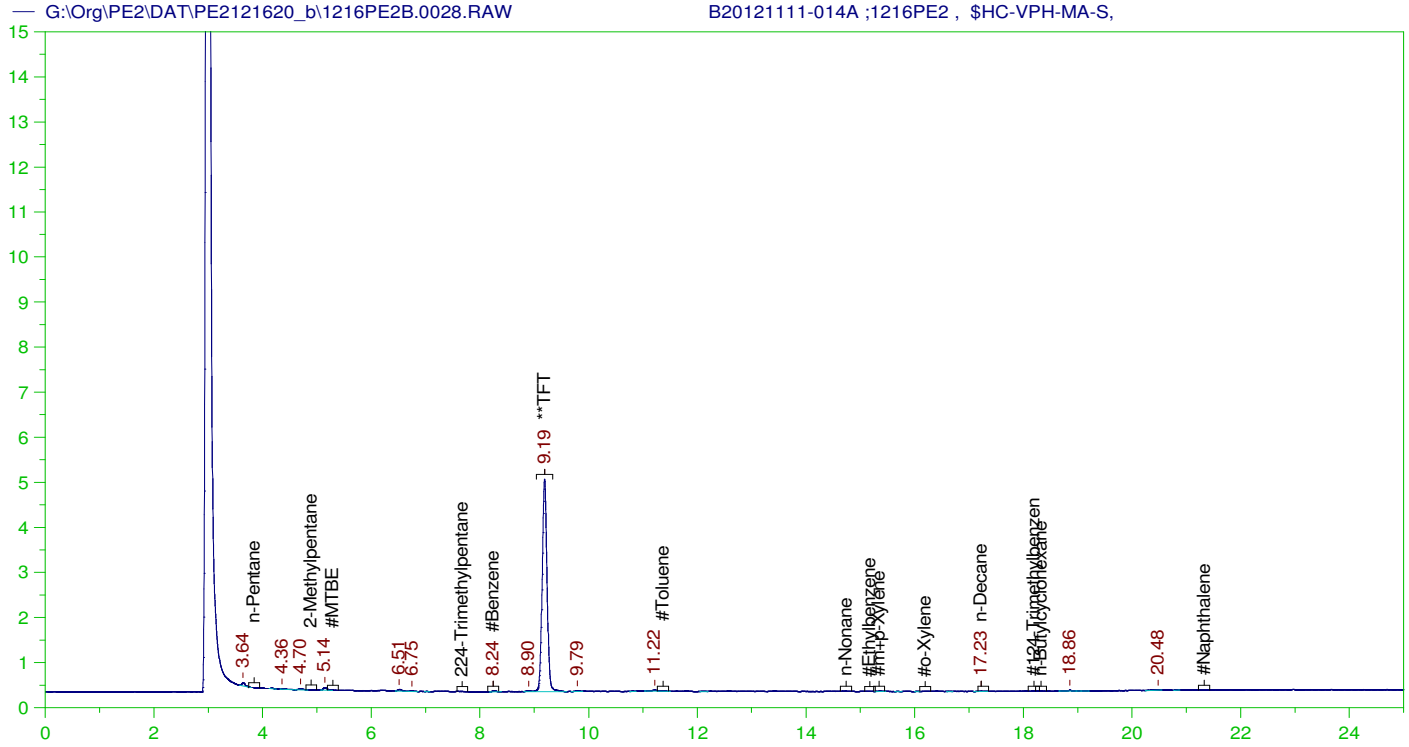
Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:435.4575 C9-C10 Aromatics Amount: 1.846596E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.276	8.276	8.276	116	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	15.337	15.337	15.337	80	.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.19	2.5	2.329	93.15	70-130

SB14 Batch ID: 151330

G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0028.RAW B20121111-014A ;1216PE2 , $HC-VPH-MA-S,



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-014A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0028.RAW
Date & Time Acquired: 12/17/2020 3:16:06 AM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.19	2.5	2.594	103.75	-

GRO Area:1355.967 GRO Amount: 7.699823E-02
TPH Area:2146.092 TPH Amount: 0.1218653

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:1438.646 C5-C8 Amount: 8.923633E-02
C9-C12 Area:404.8388 C9-C12 Amount: 2.680206E-02

SB15 Batch ID: 151330

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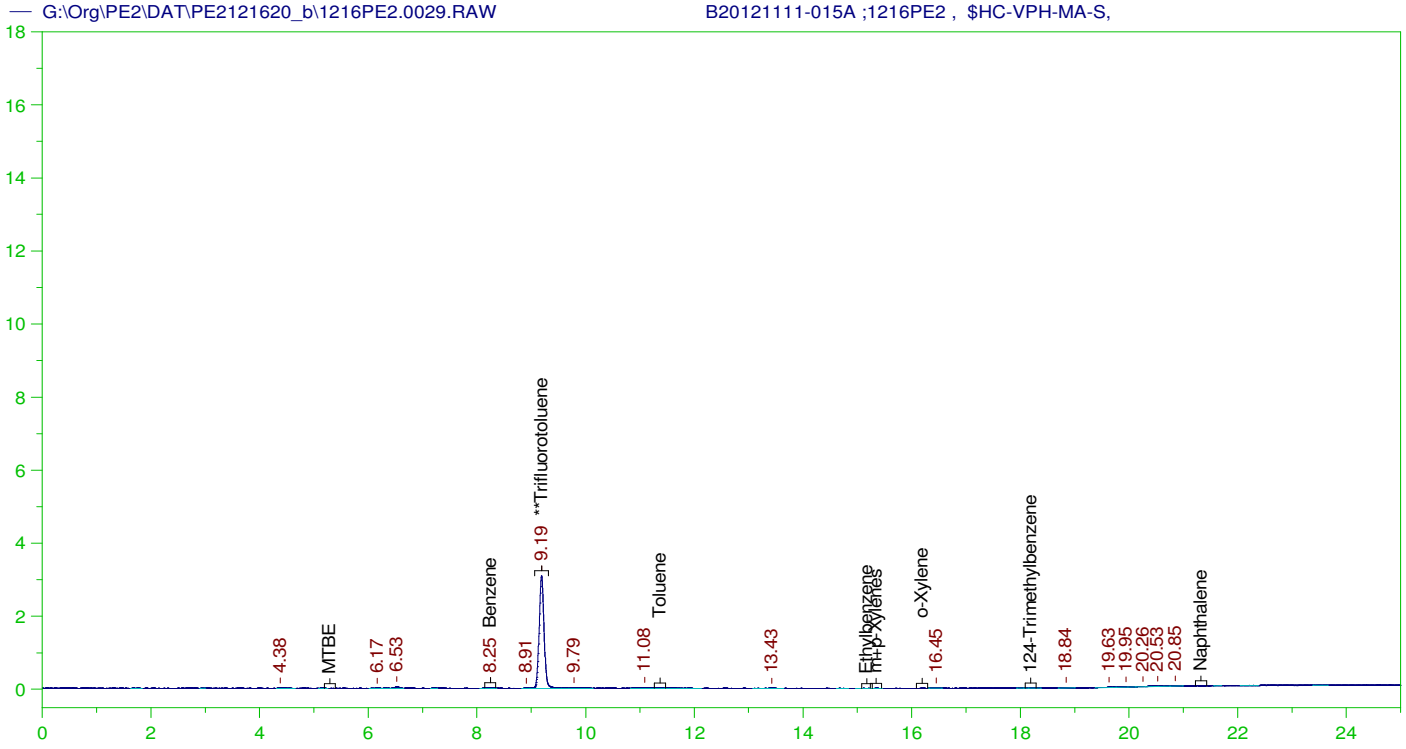

VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-015A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0029.RAW
Date & Time Acquired: 12/17/2020 3:51:48 AM
Method File: G:\Org\PE2\Methods\201111V1111-15%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:552.0867 C9-C10 Aromatics Amount: 2.341172E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.248	8.248	8.248	125	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	.	.	.		.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.189	2.5	2.32	92.81	70-130

SB15 Batch ID: 151330

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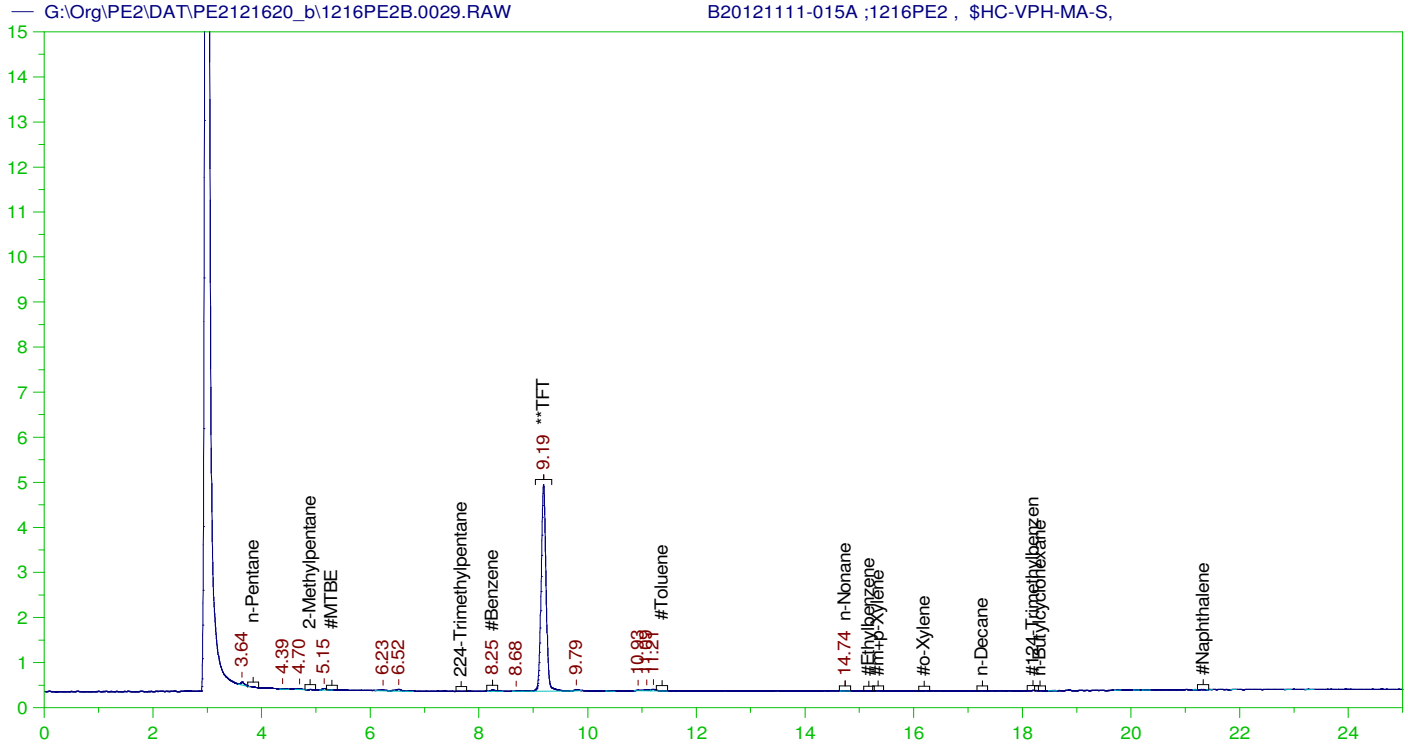

VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-015A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0029.RAW
Date & Time Acquired: 12/17/2020 3:51:49 AM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.189	2.5	2.535	101.4	-

GRO Area:1495.238 GRO Amount: 8.490672E-02
TPH Area:2120.119 TPH Amount: 0.1203904

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:1586.76 C5-C8 Amount: 9.842351E-02
C9-C12 Area:151.7368 C9-C12 Amount: 1.004562E-02

SB16 Batch ID: 151330

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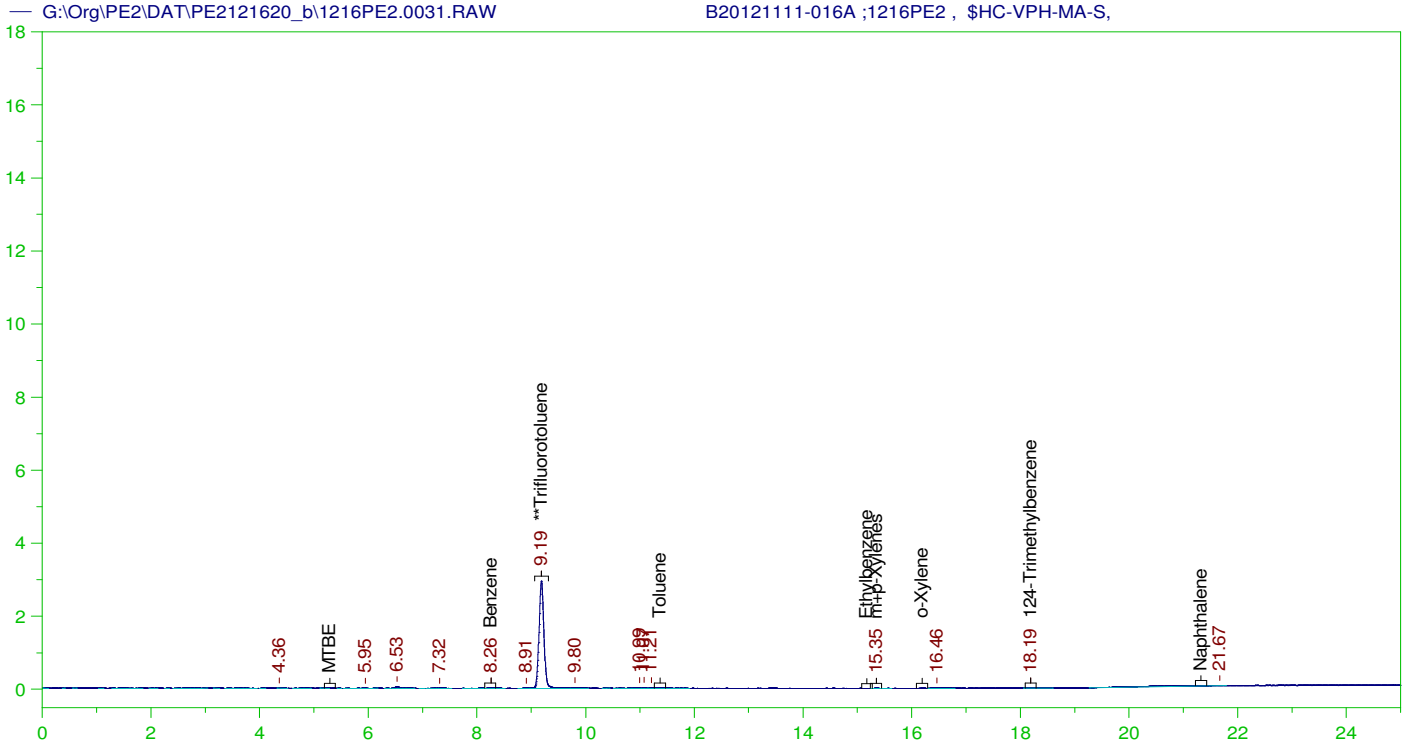


VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-016A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0031.RAW
Date & Time Acquired: 12/17/2020 5:03:11 AM
Method File: G:\Org\PE2\Methods\201111V1111-16%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

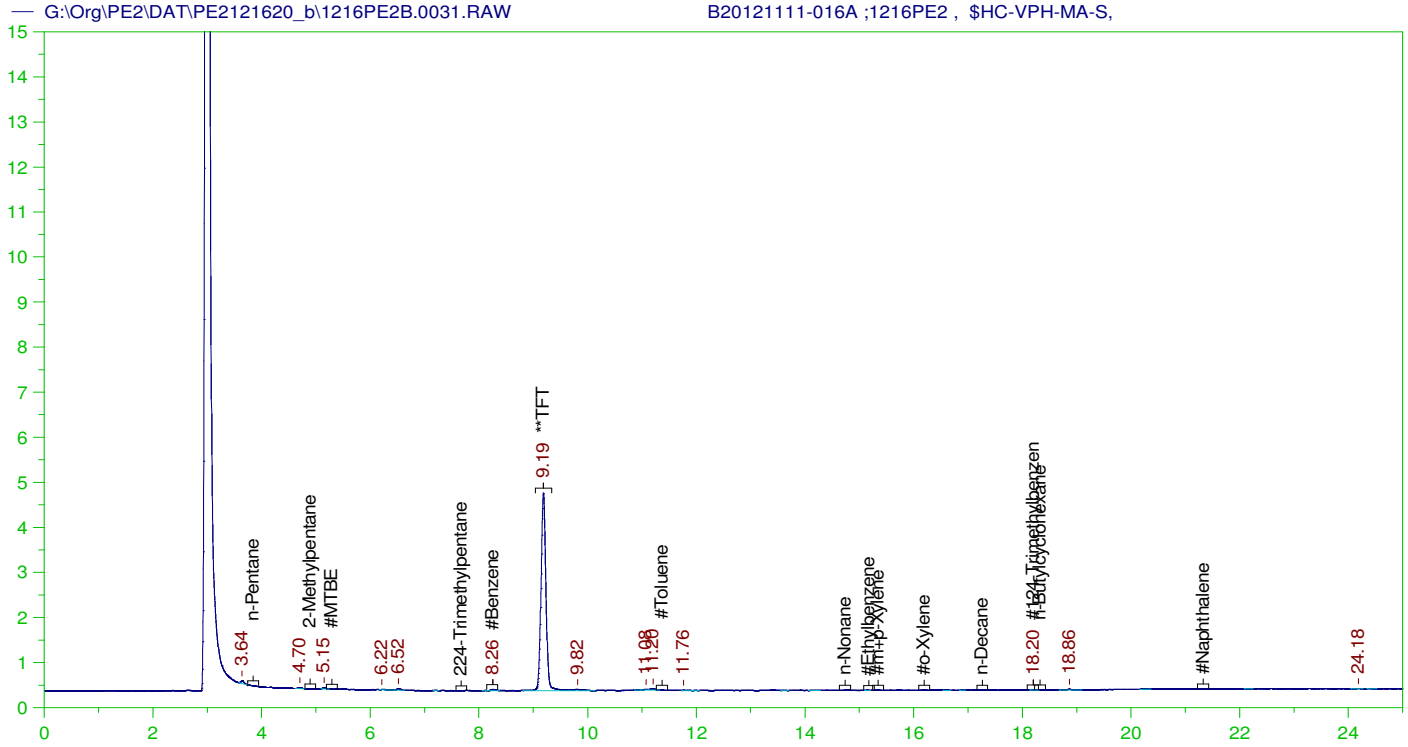
Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:289.1317 C9-C10 Aromatics Amount: 1.226088E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.262	8.262	8.262	166	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	15.347	15.347	15.347	88	.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	18.194	18.194	18.194	106	.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.187	2.5	2.216	88.64	70-130

SB16 Batch ID: 151330

G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0031.RAW B20121111-016A ;1216PE2 , $HC-VPH-MA-S,



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-016A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0031.RAW
Date & Time Acquired: 12/17/2020 5:03:11 AM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC
**TFT	9.187	2.5	2.425	97. -

GRO Area:1608.129 GRO Amount: 9.131718E-02
TPH Area:2316.863 TPH Amount: 0.1315625

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:1633.592 C5-C8 Amount: 0.1013284
C9-C12 Area:336.4045 C9-C12 Amount: 2.227142E-02

SB17 Batch ID: 151330

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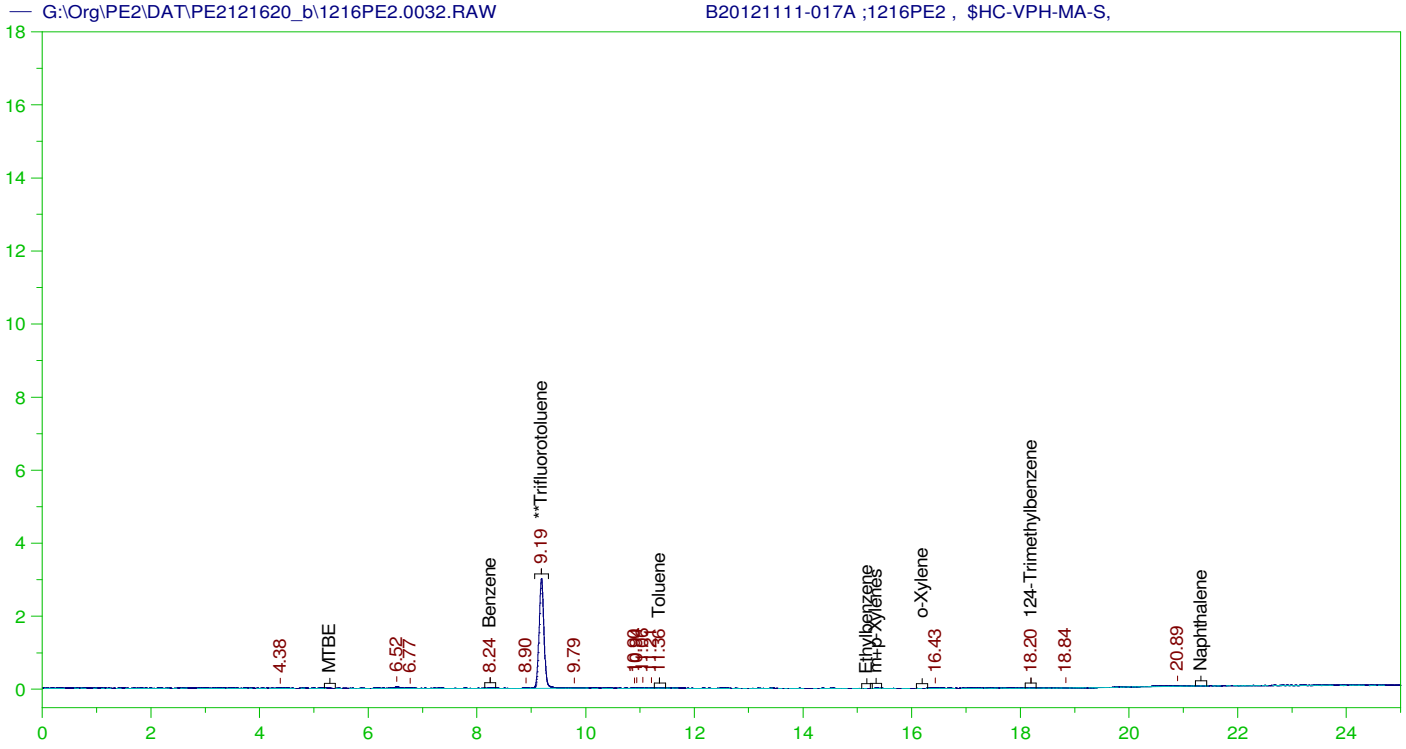


VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-017A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0032.RAW
Date & Time Acquired: 12/17/2020 5:38:55 AM
Method File: G:\Org\PE2\Methods\201111V1111-17%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

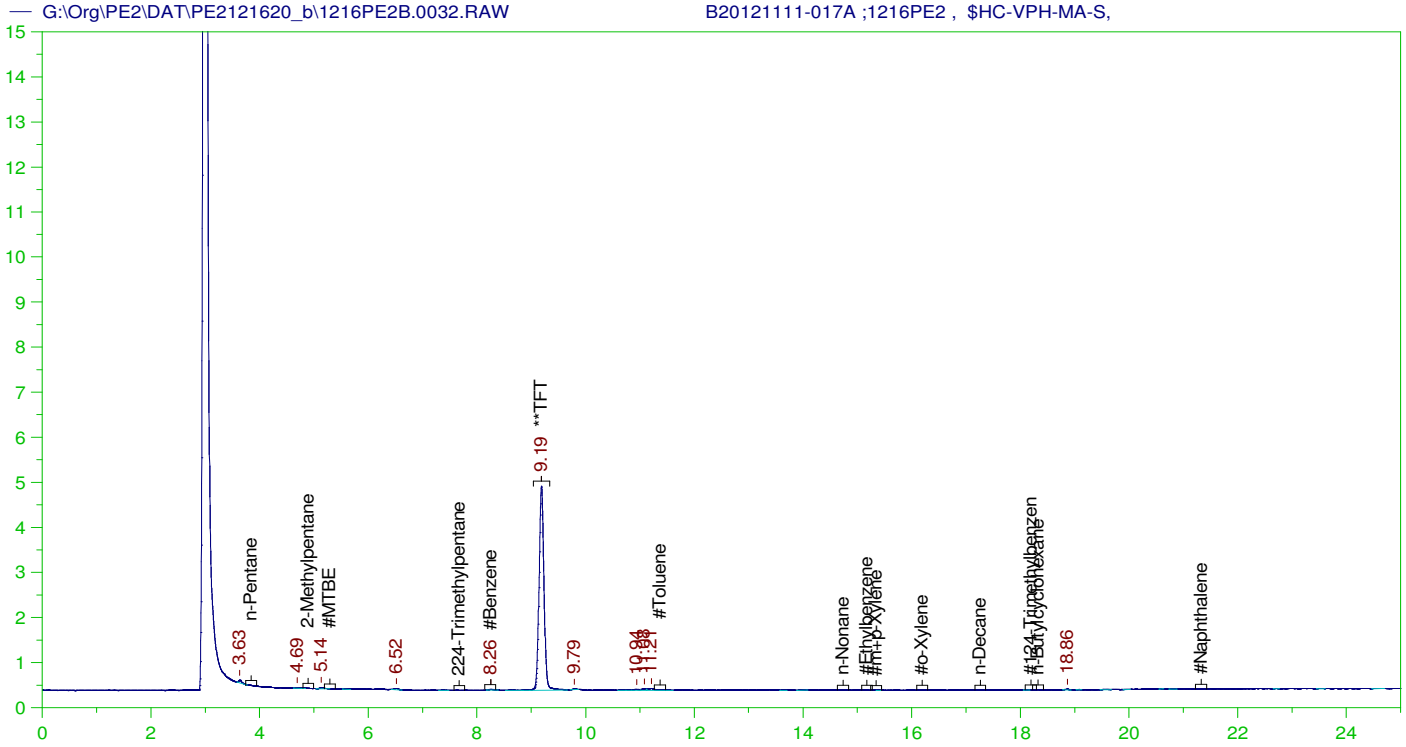
Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:965.6653 C9-C10 Aromatics Amount: 4.094988E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.243	8.243	8.243	141	.05	U
Toluene	11.356	11.356	11.356	53	.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	.	.	.		.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	18.198	18.198	18.198	53	.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.188	2.5	2.264	90.58	70-130

SB17 Batch ID: 151330

G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0032.RAW B20121111-017A ;1216PE2 , $HC-VPH-MA-S,



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-017A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0032.RAW
Date & Time Acquired: 12/17/2020 5:38:55 AM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

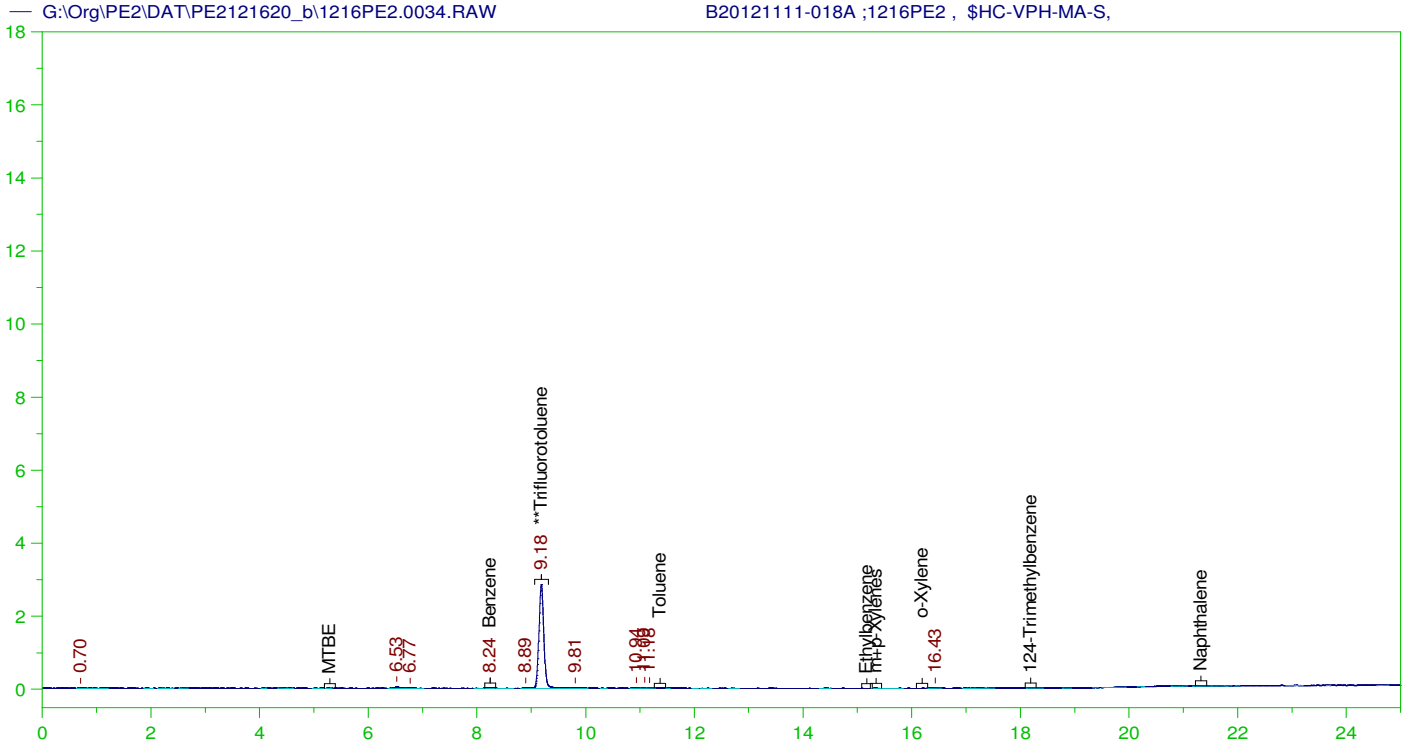
SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.188	2.5	2.495	99.81	-

GRO Area:1558.822 GRO Amount: 8.851732E-02
TPH Area:2172.484 TPH Amount: 0.123364

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:1635.967 C5-C8 Amount: 0.1014757
C9-C12 Area:216.8482 C9-C12 Amount: 1.435628E-02

SB18 Batch ID: 151330

G:\Org\PE2\DAT\PE2121620_b\1216PE2.0034.RAW B20121111-018A ;1216PE2 , $HC-VPH-MA-S,



VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-018A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0034.RAW
Date & Time Acquired: 12/17/2020 6:50:52 AM
Method File: G:\Org\PE2\Methods\201111V1111-18%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:407.6978 C9-C10 Aromatics Amount: 1.728878E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.243	8.243	8.243	180	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	.	.	.		.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.185	2.5	2.138	85.52	70-130

SB18 Batch ID: 151330

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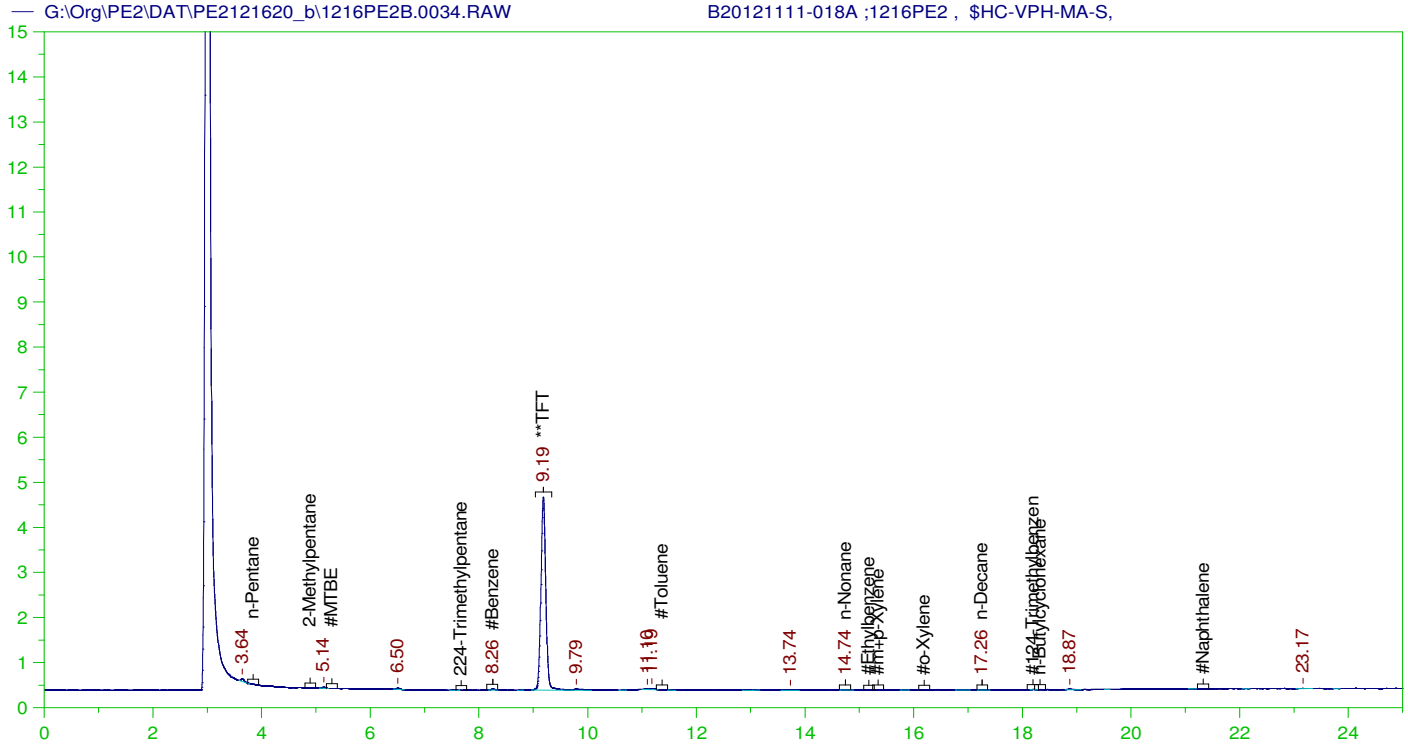

VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-018A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0034.RAW
Date & Time Acquired: 12/17/2020 6:50:52 AM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.185	2.5	2.365	94.61	-

GRO Area:1345.877 GRO Amount: 7.642528E-02
TPH Area:1843.369 TPH Amount: 0.1046752

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:1136.355 C5-C8 Amount: 7.048584E-02
C9-C12 Area:362.3702 C9-C12 Amount: 2.399046E-02

SB19 Batch ID: 151330

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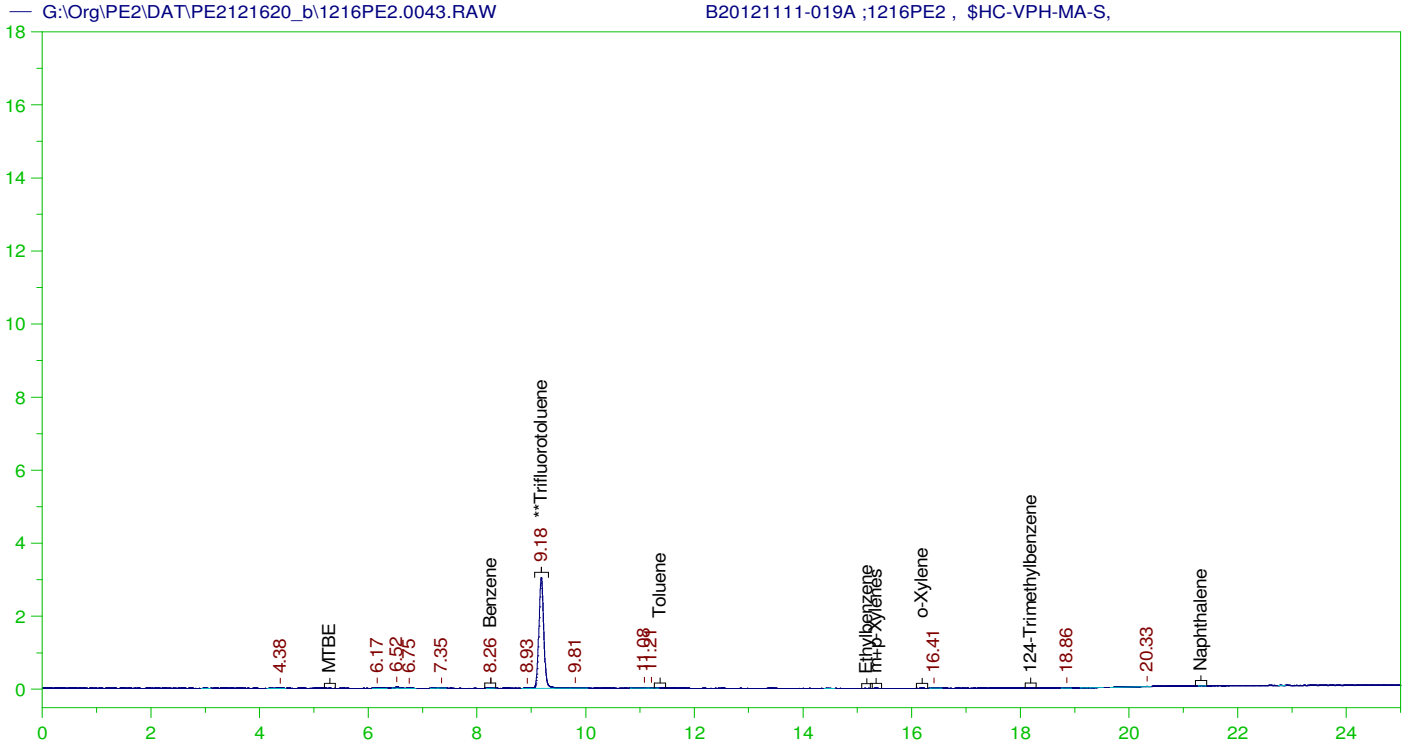


VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-019A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0043.RAW
Date & Time Acquired: 12/17/2020 12:24:17 PM
Method File: G:\Org\PE2\Methods\201111VPH%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

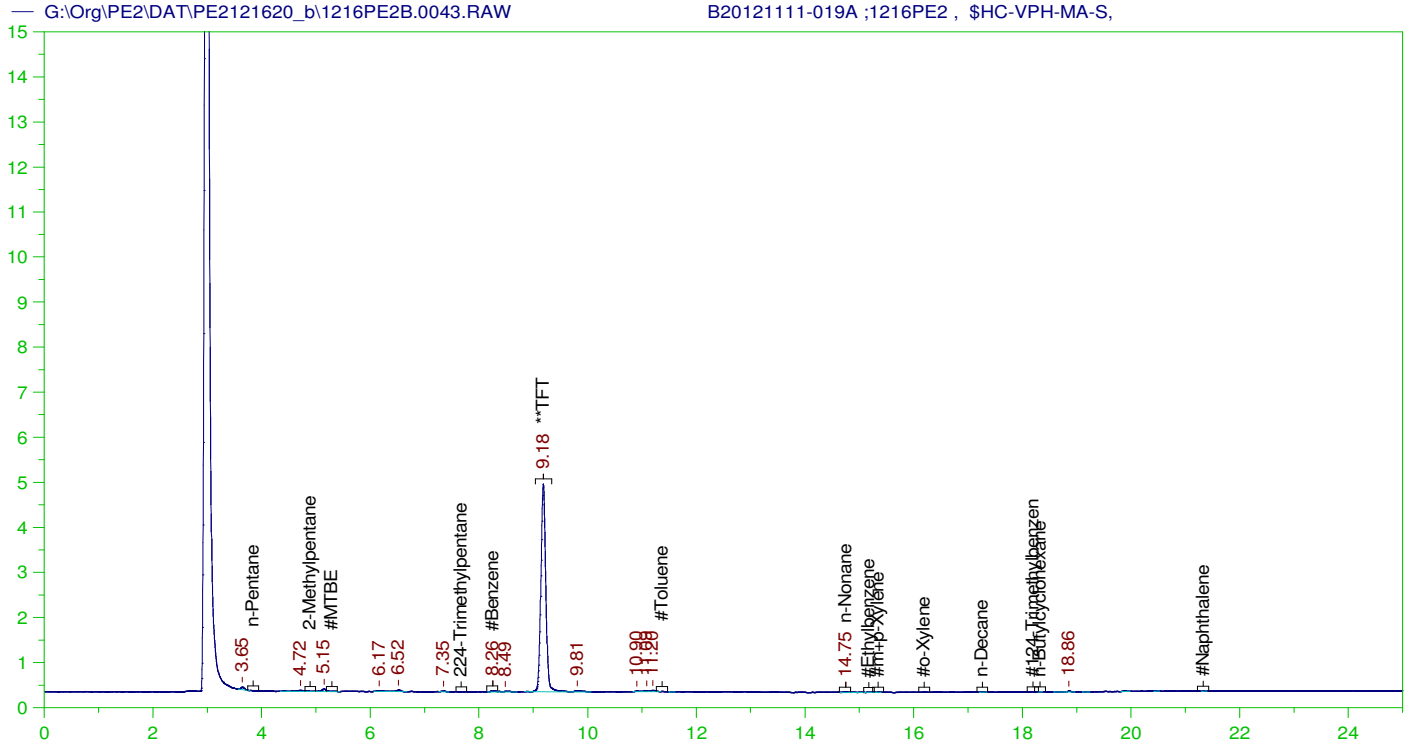
Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:344.2312 C9-C10 Aromatics Amount: 1.459743E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.256	8.256	8.256	89	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	.	.	.		.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.184	2.5	2.294	91.77	70-130

SB19 Batch ID: 151330

G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0043.RAW B20121111-019A ;1216PE2 , $HC-VPH-MA-S,



VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-019A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0043.RAW
Date & Time Acquired: 12/17/2020 12:24:17 PM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.184	2.5	2.546	101.86	-

GRO Area:1767.559 GRO Amount: 0.1003704
TPH Area:2495.014 TPH Amount: 0.1416787

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:1879.838 C5-C8 Amount: 0.1166026
C9-C12 Area:313.9207 C9-C12 Amount: 0.0207829

SB20 Batch ID: 151330

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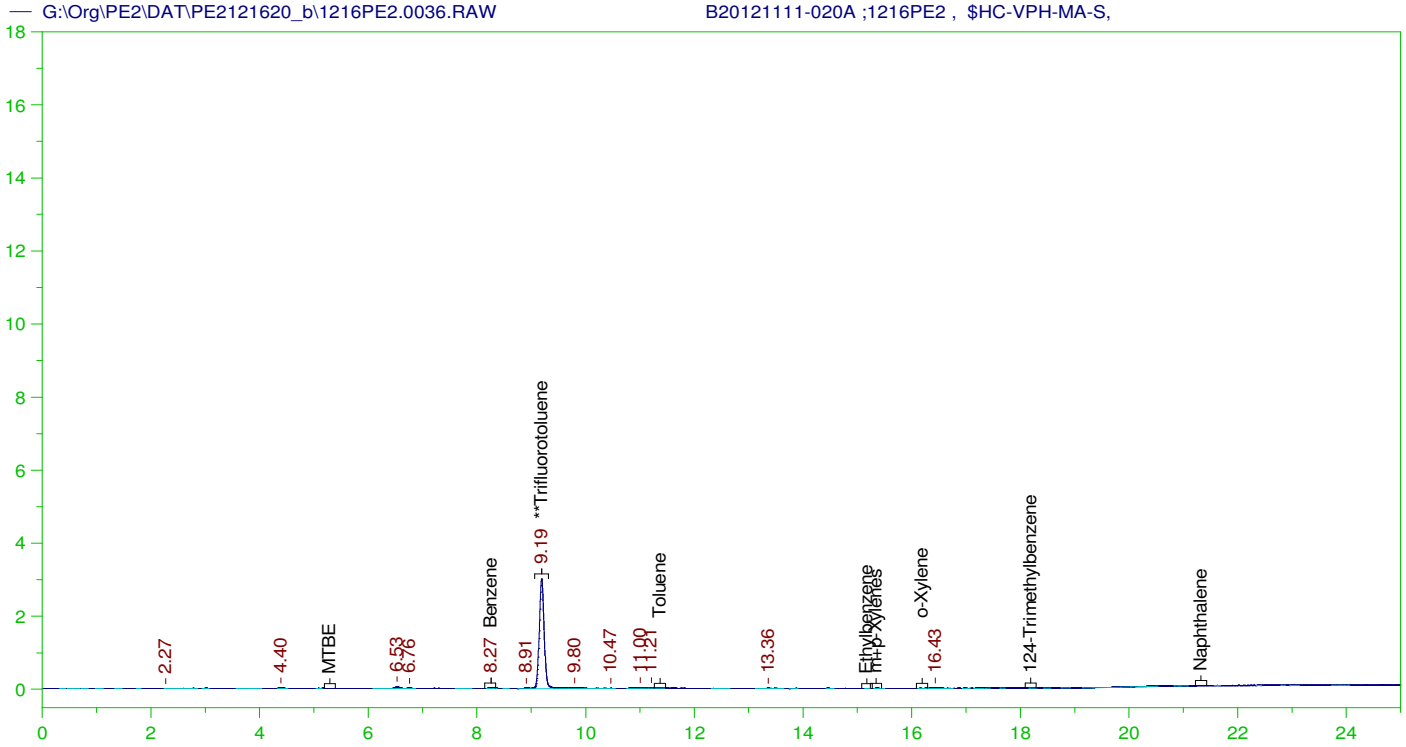

VPH AROMATICS PHOTOIONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-020A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2.0036.RAW
Date & Time Acquired: 12/17/2020 8:13:13 AM
Method File: G:\Org\PE2\Methods\201111V1111-20%.MET
Calibration File: G:\Org\PE2\Cals\201111VPH.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C9 to C10 Aromatic Hydrocarbons: 471.6328
Rt range for C9 to C10 Aromatics: 16.289 to 21.226
Aromatic Hydrocarbon Range Area and Quantitation:
C9-C10 Aromatics Area:556.8268 C9-C10 Aromatics Amount: 2.361273E-02

TARGET ANALYTES	RT	CAL RRT	RRT	AREA	AMOUNT	FLAG
MTBE	.	.	.		.1	U
Benzene	8.265	8.265	8.265	85	.05	U
Toluene	.	.	.		.05	U
Ethylbenzene	.	.	.		.05	U
m+p-Xylenes	.	.	.		.05	U
o-Xylene	.	.	.		.05	U
124-Trimethylbenzene	.	.	.		.05	U
Naphthalene	.	.	.		.1	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
**Trifluorotoluene	9.191	2.5	2.259	90.36	70-130

SB20 Batch ID: 151330

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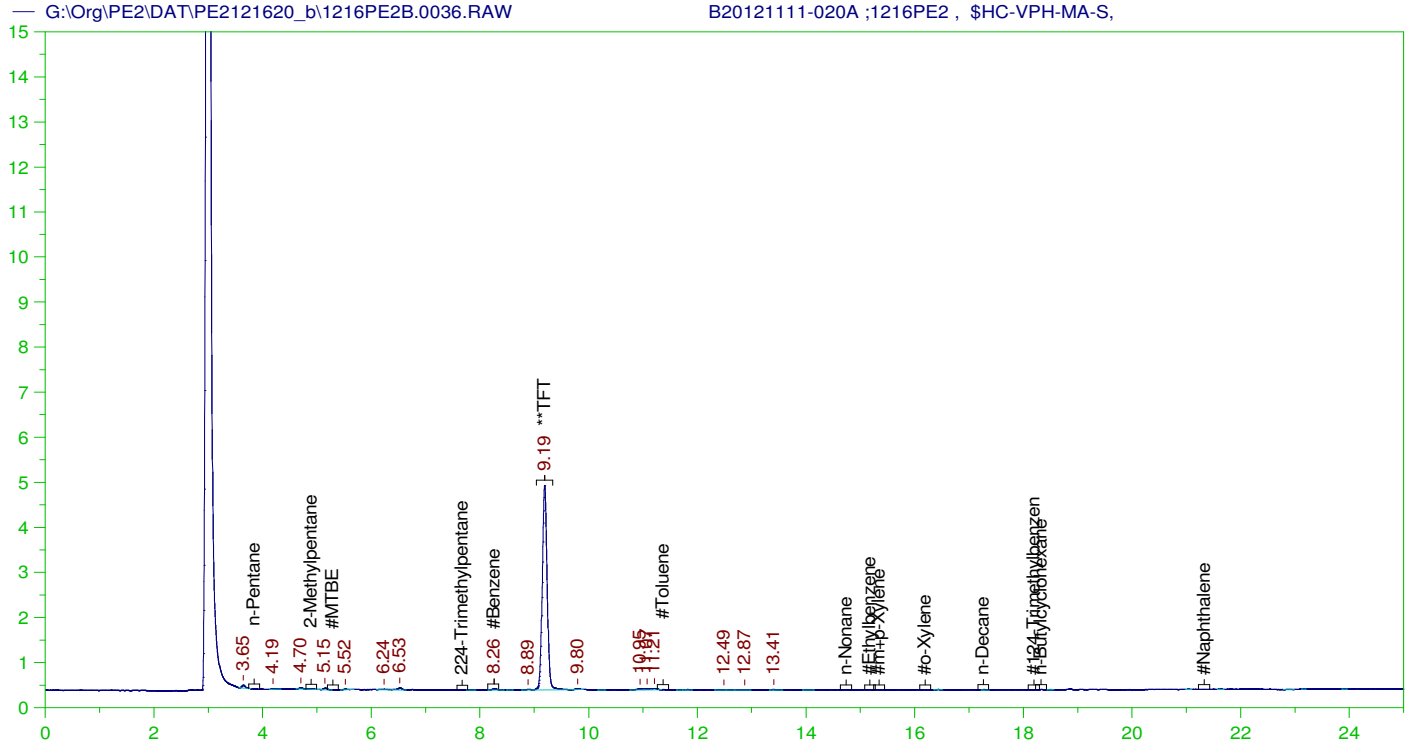


VPH ALIPHATICS FLAME IONIZATION DETECTOR CHROMATOGRAM REPORT

Sample Name: B20121111-020A ;1216PE2 , $HC-VPH-MA-S,
Raw File: G:\Org\PE2\DAT\PE2121620_b\1216PE2B.0036.RAW
Date & Time Acquired: 12/17/2020 8:13:13 AM
Method File: G:\Org\PE2\Methods\201111VPHB%.MET
Calibration File: G:\Org\PE2\Cals\201111VPHB.CAL
Sample Weight: 50 Dilution: 1 S.A.: 1

Mean RF for C5 to C8 Aliphatic Hydrocarbons: 322.4351
Mean RF for C9 to C12 Aliphatic Hydrocarbons: 302.0953
Mean RF for all calibrated compounds: 352.2073
Rt range for Gasoline Range Organics: 4.794165 to 17.36439
Rt range for C5 to C8 Aliphatic Hydrocarbons: 3.745536 to 14.63418
Rt range for C9 to C12 Aliphatic Hydrocarbons: 14.68418 to 21.22657

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	
**TFT	9.192	2.5	2.512	100.49	-

GRO Area:2081.928 GRO Amount: 0.1182217
TPH Area:2757.008 TPH Amount: 0.156556

Aliphatic Hydrocarbon Areas and Quantitations uncorrected for Aromatics:
C5-C8 Area:2280.023 C5-C8 Amount: 0.1414253
C9-C12 Area:91.37585 C9-C12 Amount: 6.049473E-03

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: MT Dept of Transportation **Work Order:** B20121111 **Report Date:** 12/18/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8015M										Batch: 151316
Lab ID: LCS-151316	2	Laboratory Control Sample				Run: GCFID-HP3-B_201214C				12/16/20 16:07
Total Extractable Hydrocarbons		179	mg/kg	10	84	60	140			
Surr: o-Terphenyl				0.067	81	40	140			
Lab ID: MB-151316	2	Method Blank				Run: GCFID-HP3-B_201214C				12/16/20 16:50
Total Extractable Hydrocarbons		ND	mg/kg	10						
Surr: o-Terphenyl				0.067	78	40	140			
Lab ID: B20121111-001AMS	2	Sample Matrix Spike				Run: GCFID-HP3-B_201214C				12/16/20 18:19
Total Extractable Hydrocarbons		232	mg/kg-dry	12	84	60	140			
Surr: o-Terphenyl				0.082	71	40	140			
Lab ID: B20121111-001AMSD	2	Sample Matrix Spike Duplicate				Run: GCFID-HP3-B_201214C				12/16/20 19:03
Total Extractable Hydrocarbons		228	mg/kg-dry	12	83	60	140	2.0	20	
Surr: o-Terphenyl				0.082	67	40	140			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: MT Dept of Transportation **Work Order:** B20121111 **Report Date:** 12/18/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **SW8015M**										Analytical Run: R353640
Lab ID: **CCV_1214HP370r-S**	15	Continuing Calibration Verification Standard								12/16/20 14:40
n-Nonane		6.79	mg/kg		102	75	125			
n-Decane		6.98	mg/kg		105	75	125			
n-Dodecane		6.74	mg/kg		101	75	125			
n-Tetradecane		6.66	mg/kg		100	75	125			
n-Hexadecane		6.67	mg/kg		100	75	125			
n-Octadecane		6.73	mg/kg		101	75	125			
n-Nonadecane		6.73	mg/kg		101	75	125			
n-Eicosane		6.70	mg/kg		100	75	125			
n-Docosane		6.70	mg/kg		101	75	125			
n-Tetracosane		6.73	mg/kg		101	75	125			
n-Hexacosane		6.75	mg/kg		101	75	125			
n-Octacosane		6.71	mg/kg		101	75	125			
n-Triacontane		6.74	mg/kg		101	75	125			
n-Hexatriacontane		6.52	mg/kg		98	75	125			
Surr: o-Terphenyl				0.067	95	75	125			
Lab ID: **CCV_1214HP385r-S**	15	Continuing Calibration Verification Standard								12/17/20 01:40
n-Nonane		6.63	mg/kg		99	75	125			
n-Decane		6.83	mg/kg		102	75	125			
n-Dodecane		6.44	mg/kg		97	75	125			
n-Tetradecane		6.38	mg/kg		96	75	125			
n-Hexadecane		6.39	mg/kg		96	75	125			
n-Octadecane		6.45	mg/kg		97	75	125			
n-Nonadecane		6.44	mg/kg		97	75	125			
n-Eicosane		6.41	mg/kg		96	75	125			
n-Docosane		6.41	mg/kg		96	75	125			
n-Tetracosane		6.43	mg/kg		96	75	125			
n-Hexacosane		6.45	mg/kg		97	75	125			
n-Octacosane		6.41	mg/kg		96	75	125			
n-Triacontane		6.43	mg/kg		96	75	125			
n-Hexatriacontane		6.22	mg/kg		93	75	125			
Surr: o-Terphenyl				0.067	91	75	125			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: MT Dept of Transportation **Work Order:** B20121111 **Report Date:** 12/18/20

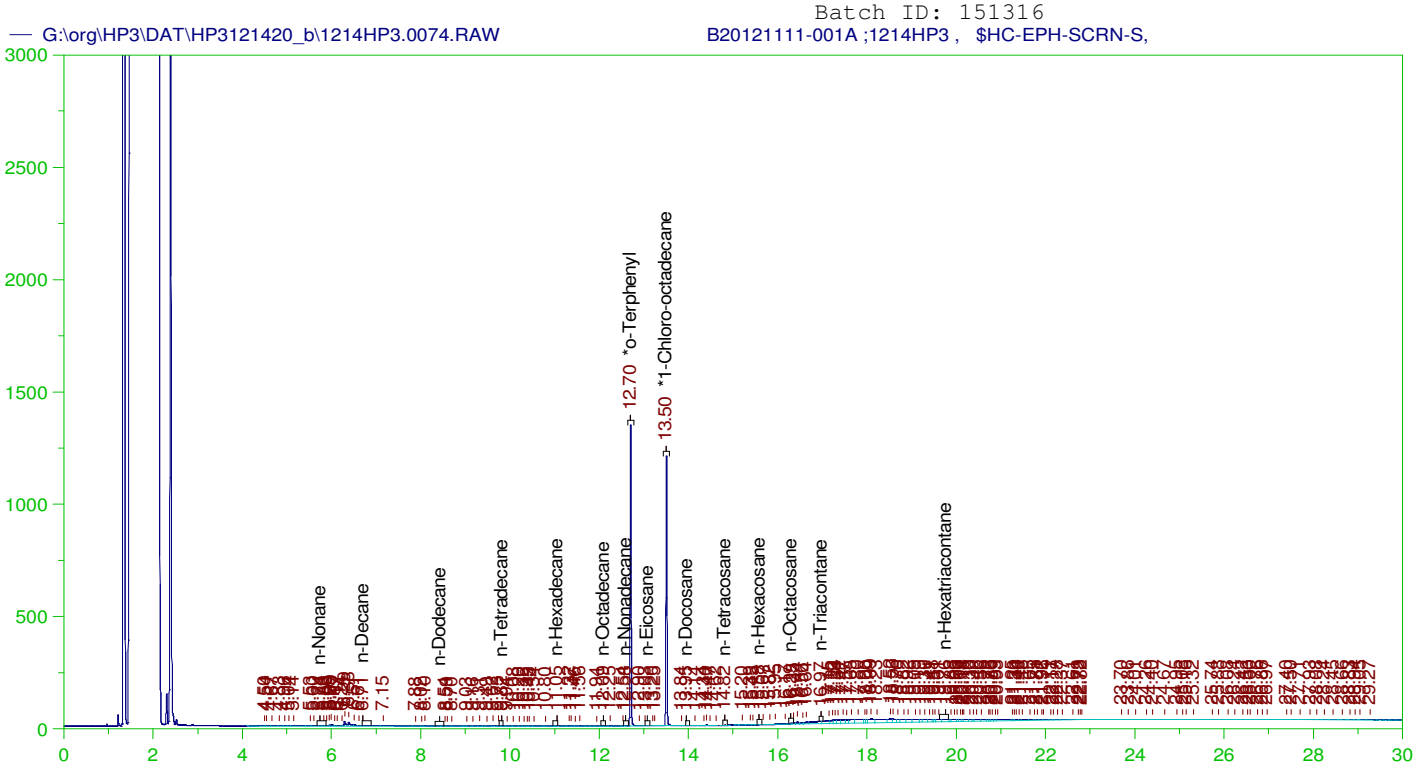
Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **SW8015M**										Analytical Run: R353652
Lab ID: **CCV_1217HP304r-S**	15	Continuing Calibration Verification Standard								12/17/20 12:39
n-Nonane		6.78	mg/kg		102	75	125			
n-Decane		7.06	mg/kg		106	75	125			
n-Dodecane		6.71	mg/kg		101	75	125			
n-Tetradecane		6.64	mg/kg		100	75	125			
n-Hexadecane		6.66	mg/kg		100	75	125			
n-Octadecane		6.73	mg/kg		101	75	125			
n-Nonadecane		6.72	mg/kg		101	75	125			
n-Eicosane		6.69	mg/kg		100	75	125			
n-Docosane		6.69	mg/kg		100	75	125			
n-Tetracosane		6.72	mg/kg		101	75	125			
n-Hexacosane		6.74	mg/kg		101	75	125			
n-Octacosane		6.70	mg/kg		100	75	125			
n-Triacontane		6.67	mg/kg		100	75	125			
n-Hexatriacontane		6.44	mg/kg		97	75	125			
Surr: o-Terphenyl				0.067	96	75	125			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

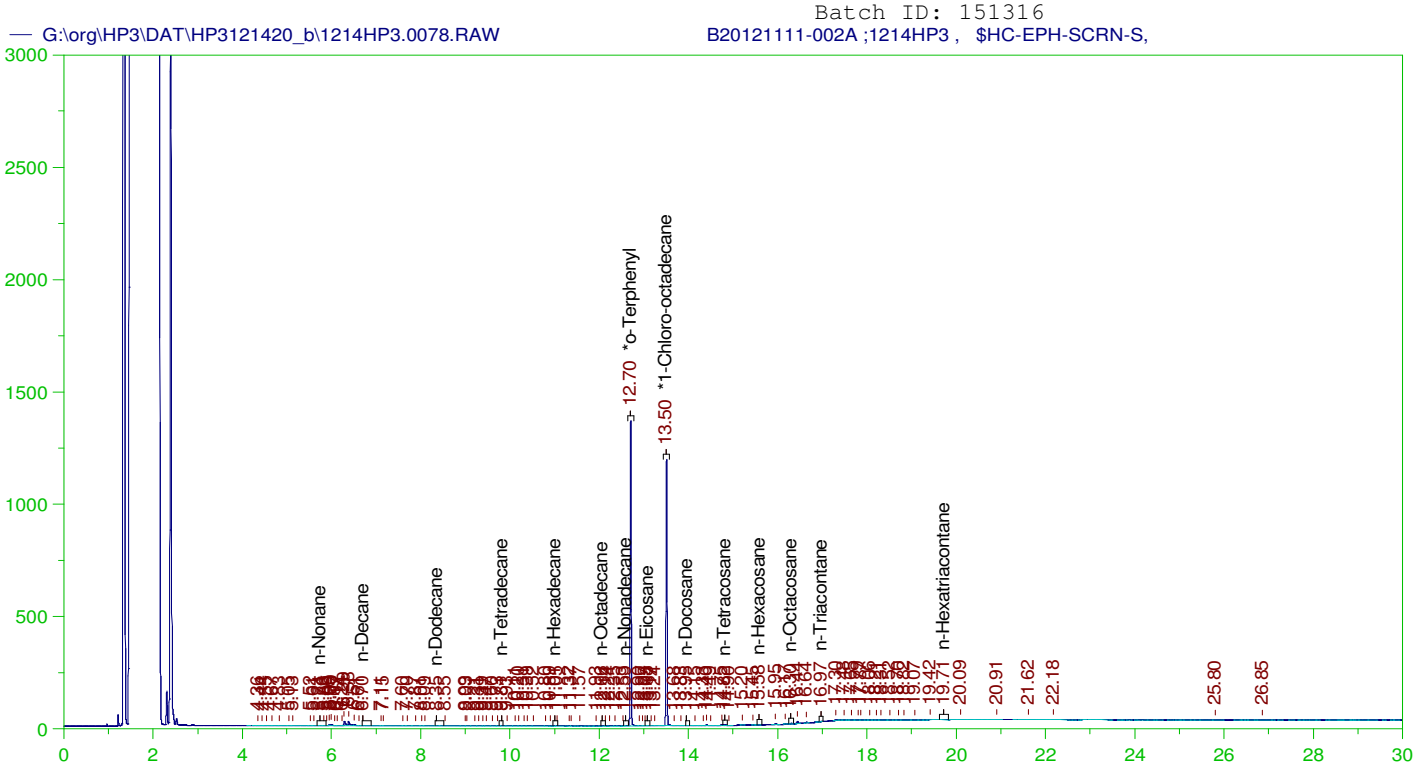
Sample Name: B20121111-001A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0074.RAW
Date & Time Acquired: 12/16/2020 5:34:58 PM
Method File: G:\Org\HP3\Methods\SR_SCN-121474-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 30.05 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.703	2239799	6.656	4.183	62.85	-
*1-Chloro-octadecane	13.503	2154188	6.656	5.182	77.85	-

DRO Area:571063 DRO Amount: 1.262565
TEH Area:4333516 TEH Amount: 9.58098
C9-C18 Area:292288.9 C9-C18 Amount: 0.6546513
C19-C36 Area:2928550 C19-C36 Amount: 6.392431

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

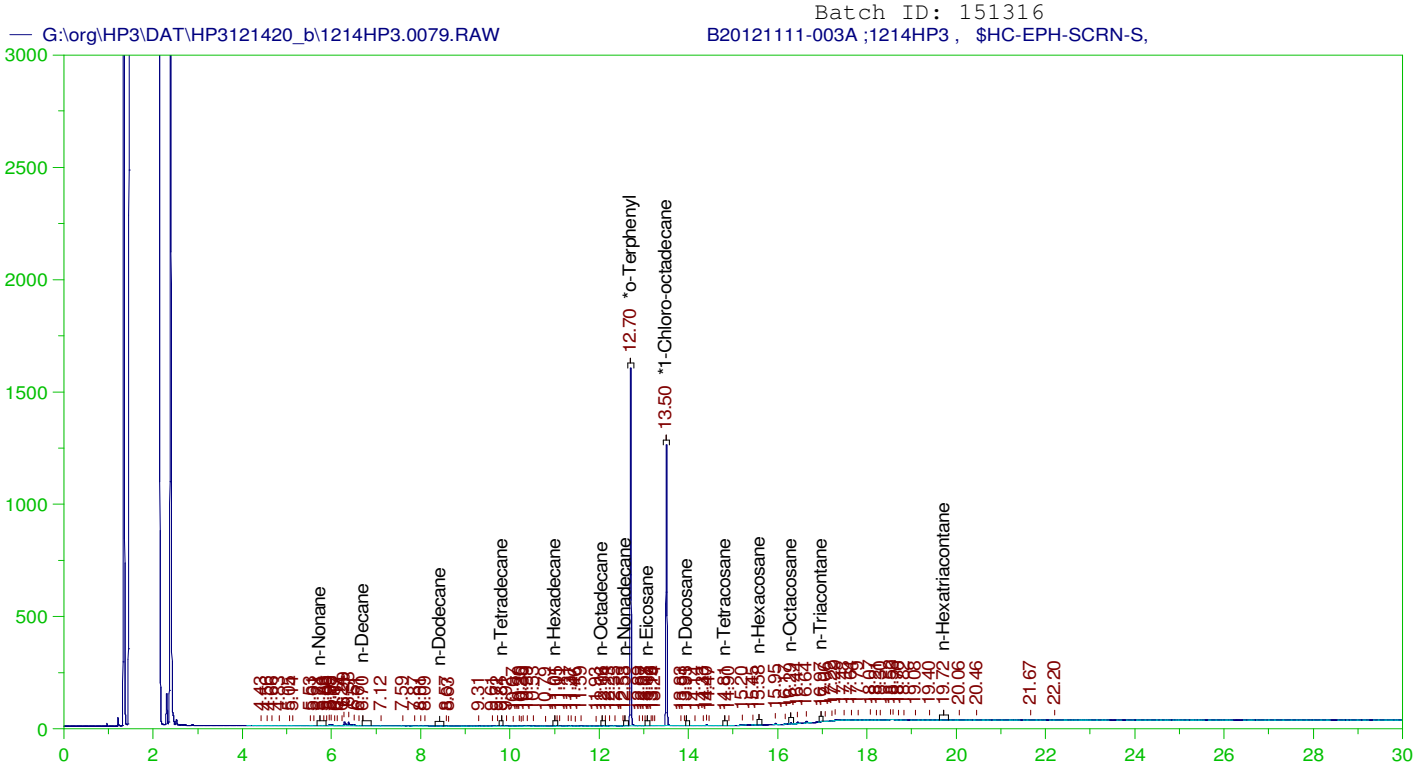
Sample Name: B20121111-002A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0078.RAW
Date & Time Acquired: 12/16/2020 8:31:42 PM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 30.01 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.704	2229375	6.664	4.169	62.56	-
*1-Chloro-octadecane	13.504	2123908	6.664	5.115	76.76	-

DRO Area:232341.8 DRO Amount: 0.5143696
TEH Area:540554.3 TEH Amount: 1.196706
C9-C18 Area:343629.8 C9-C18 Amount: 0.7706673
C19-C36 Area:112320.8 C19-C36 Amount: 0.2455002

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

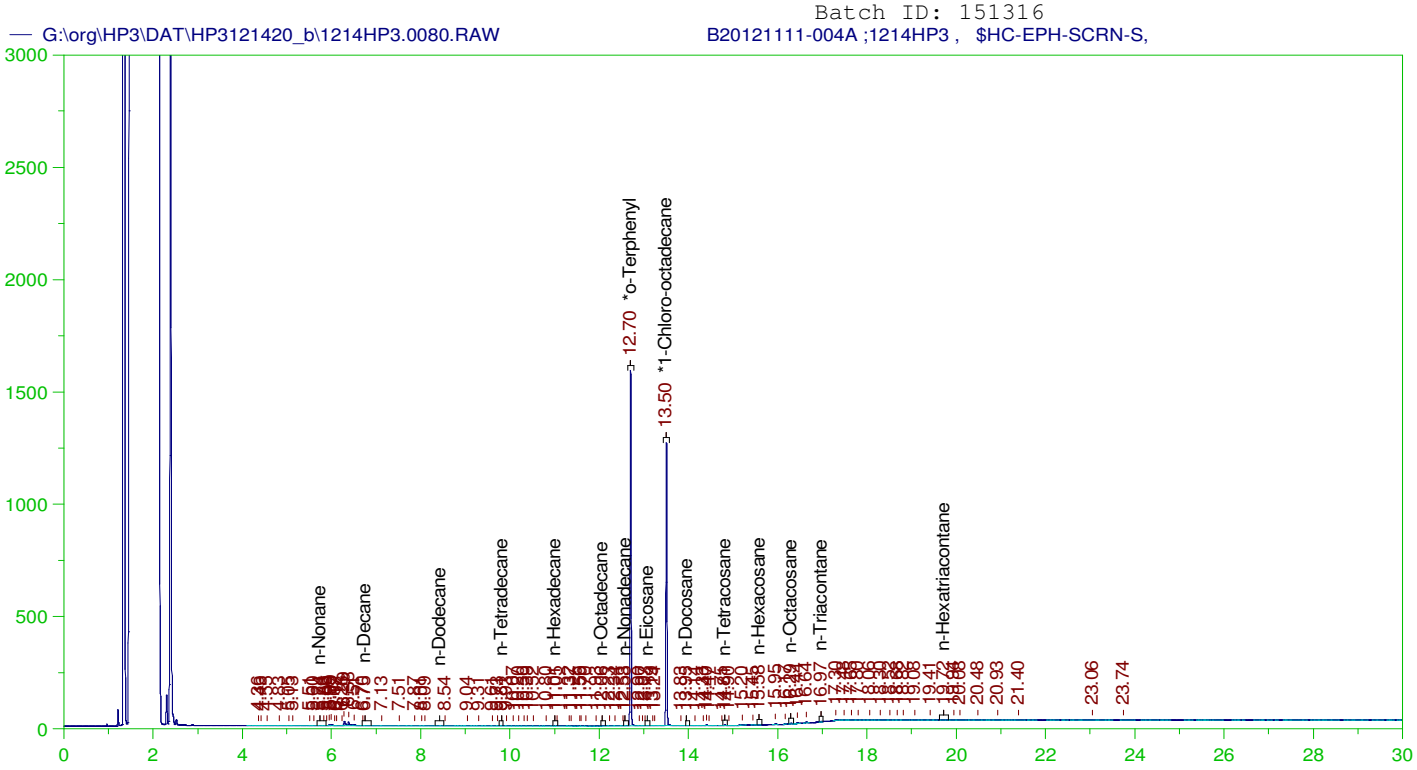
Sample Name: B20121111-003A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0079.RAW
Date & Time Acquired: 12/16/2020 9:15:53 PM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 29.99 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.703	2634829	6.669	4.931	73.94	-
*1-Chloro-octadecane	13.503	2211984	6.669	5.331	79.94	-

DRO Area:208481.8 DRO Amount: 0.461855
TEH Area:499532.3 TEH Amount: 1.106627
C9-C18 Area:277553.1 C9-C18 Amount: 0.6228907
C19-C36 Area:145929.3 C19-C36 Amount: 0.3191712

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

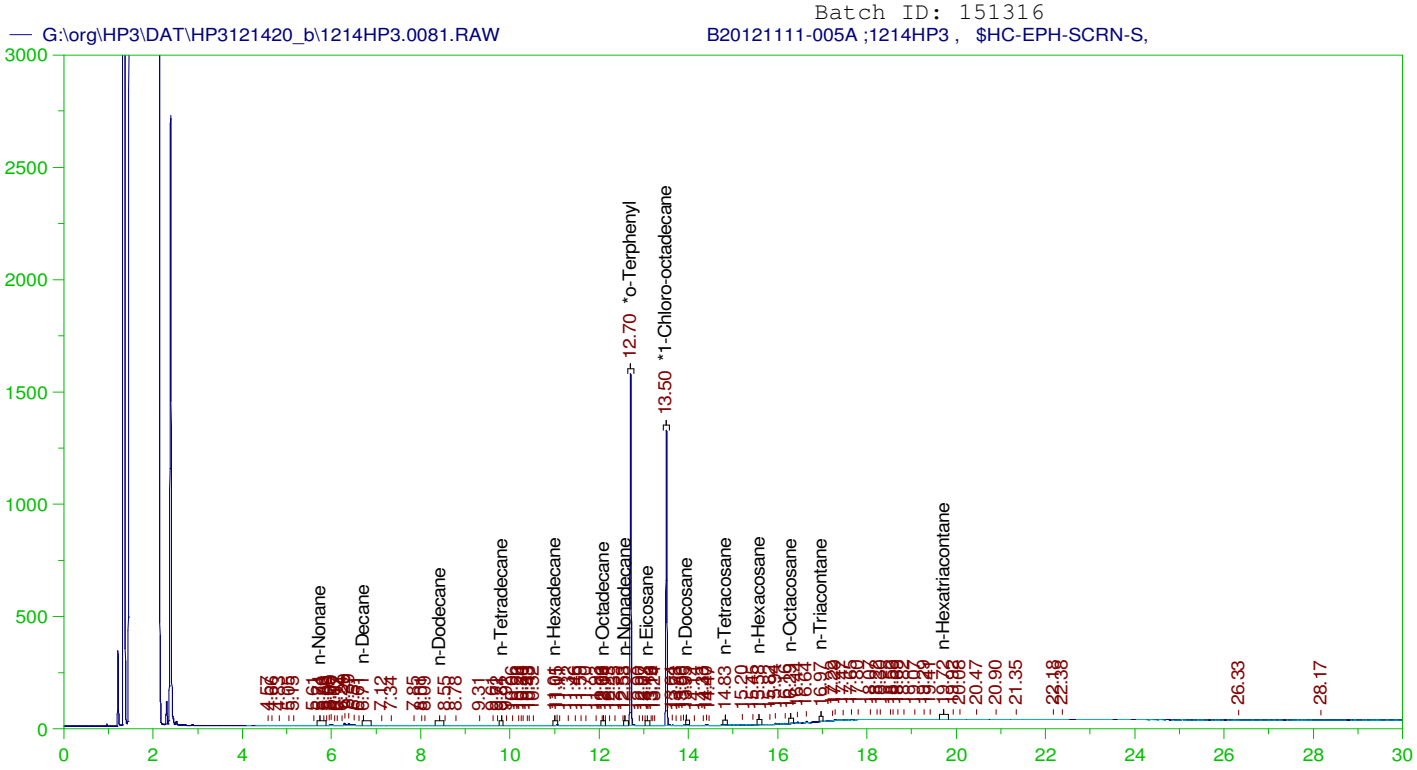
Sample Name: B20121111-004A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0080.RAW
Date & Time Acquired: 12/16/2020 9:59:59 PM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 29.99 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.702	2626421	6.669	4.915	73.7	-
*1-Chloro-octadecane	13.502	2238761	6.669	5.396	80.91	-

DRO Area:186428 DRO Amount: 0.4129987
TEH Area:472630.5 TEH Amount: 1.04703
C9-C18 Area:285935.4 C9-C18 Amount: 0.6417024
C19-C36 Area:105271.5 C19-C36 Amount: 0.2302461

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

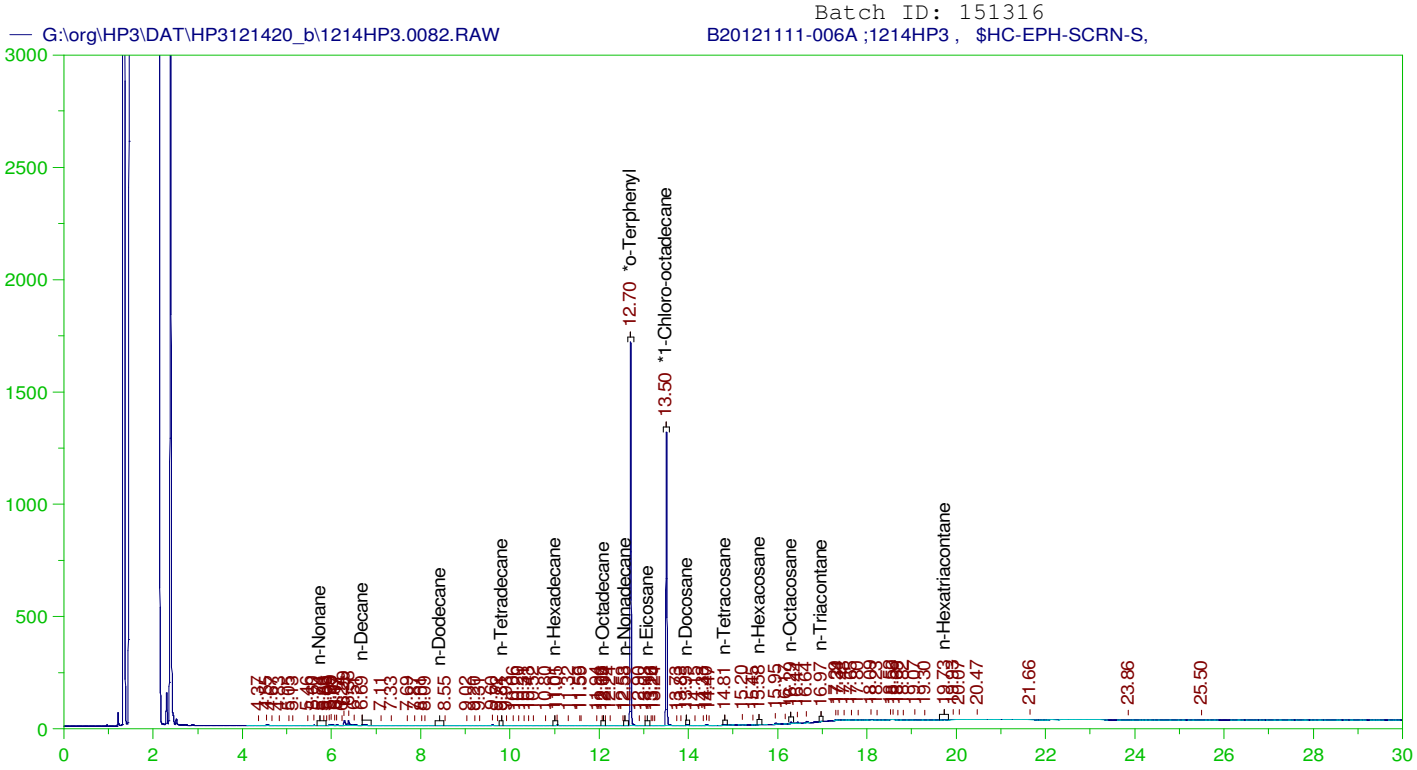
Sample Name: B20121111-005A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0081.RAW
Date & Time Acquired: 12/16/2020 10:44:09 PM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 30 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.702	2626567	6.667	4.914	73.7	-
*1-Chloro-octadecane	13.502	2279965	6.667	5.493	82.4	-

DRO Area:217500.5 DRO Amount: 0.4816738
TEH Area:457916 TEH Amount: 1.014095
C9-C18 Area:233306.8 C9-C18 Amount: 0.5234176
C19-C36 Area:150540.5 C19-C36 Amount: 0.3291471

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

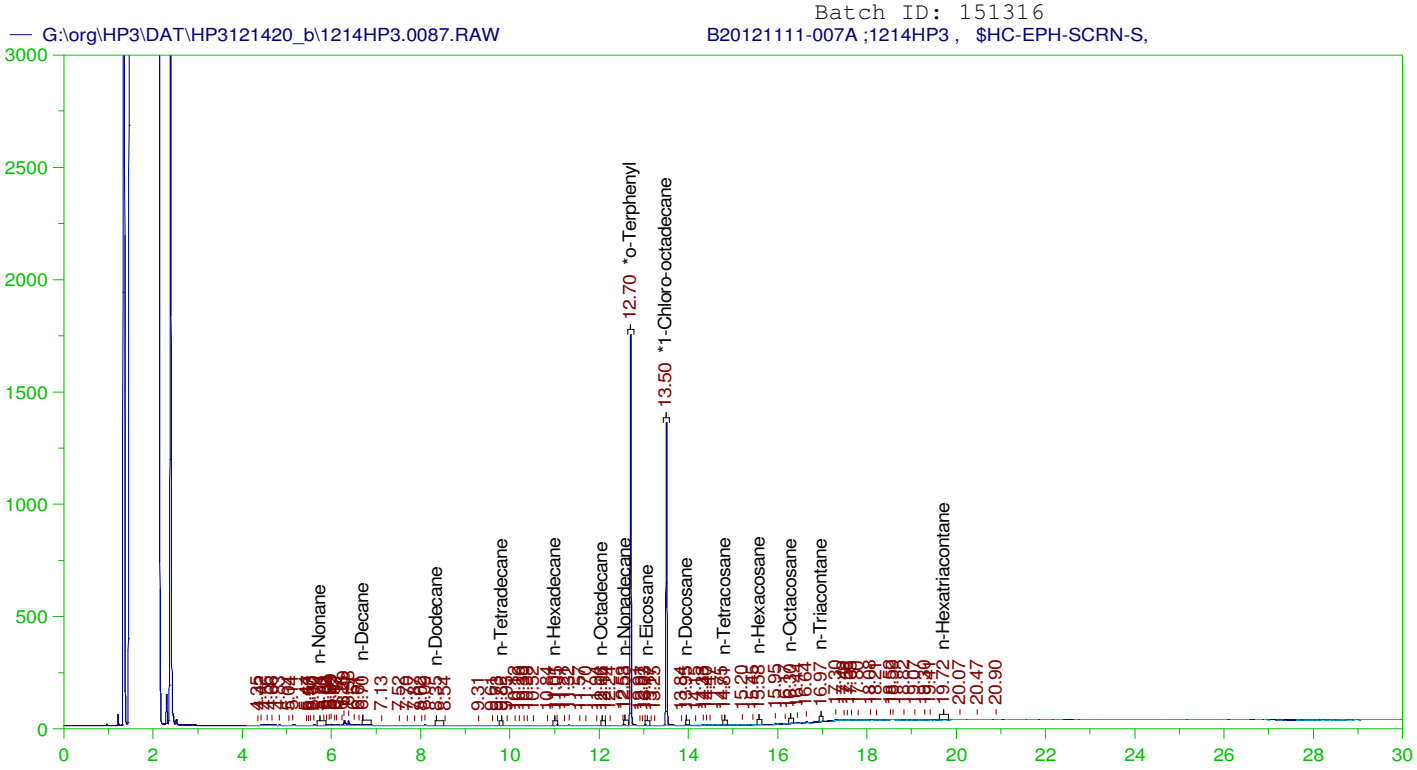
Sample Name: B20121111-006A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0082.RAW
Date & Time Acquired: 12/16/2020 11:28:21 PM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 29.97 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.703	2837489	6.673	5.313	79.62	-
*1-Chloro-octadecane	13.503	2322812	6.673	5.602	83.95	-

DRO Area:235461.5 DRO Amount: 0.521972
TEH Area:556030.5 TEH Amount: 1.232611
C9-C18 Area:336224 C9-C18 Amount: 0.7550645
C19-C36 Area:133656 C19-C36 Amount: 0.2925227

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

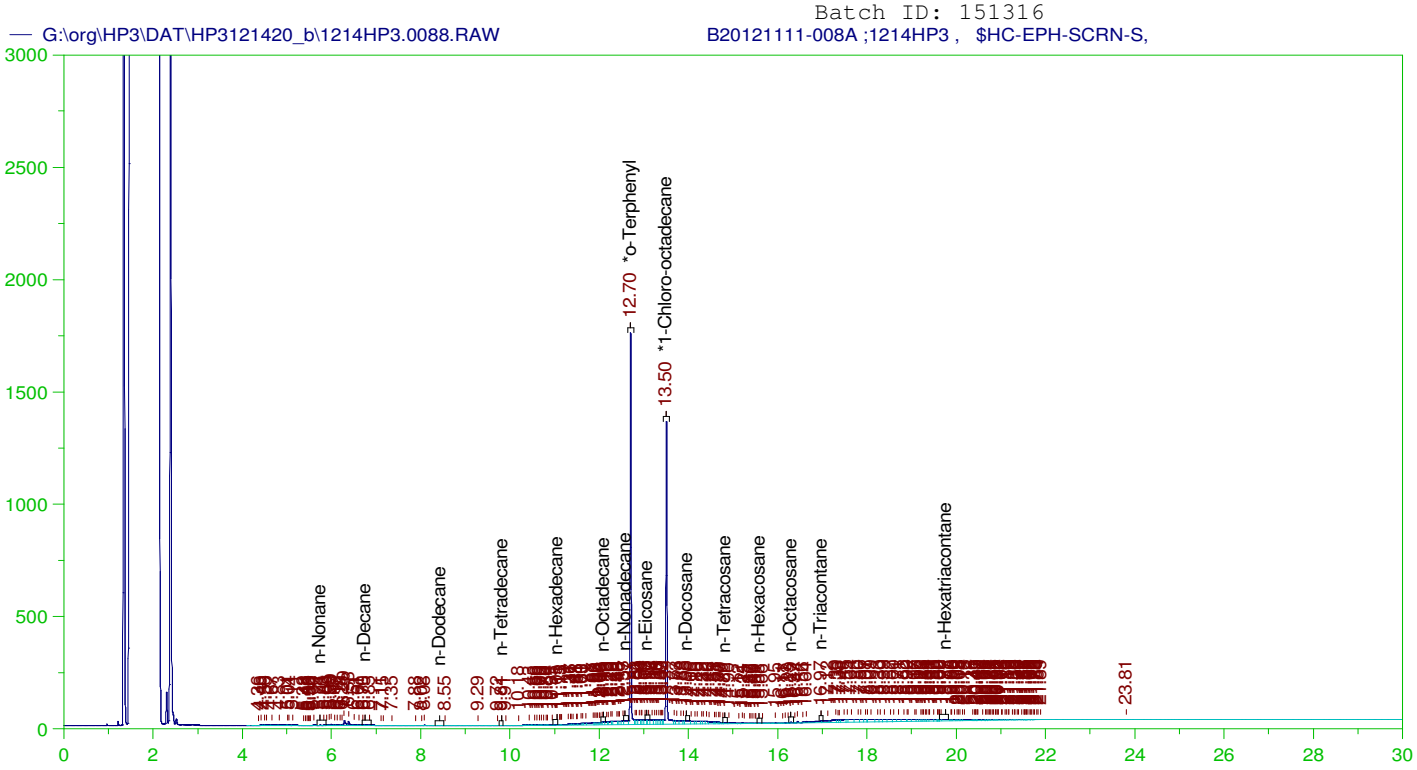
Sample Name: B20121111-007A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0087.RAW
Date & Time Acquired: 12/17/2020 3:08:38 AM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 30.03 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.703	2895005	6.66	5.41	81.24	-
*1-Chloro-octadecane	13.503	2382855	6.66	5.735	86.12	-

DRO Area:188930.3 DRO Amount: 0.4179845
TEH Area:509381.3 TEH Amount: 1.126942
C9-C18 Area:319138.4 C9-C18 Amount: 0.7152631
C19-C36 Area:103482.3 C19-C36 Amount: 0.2260312

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

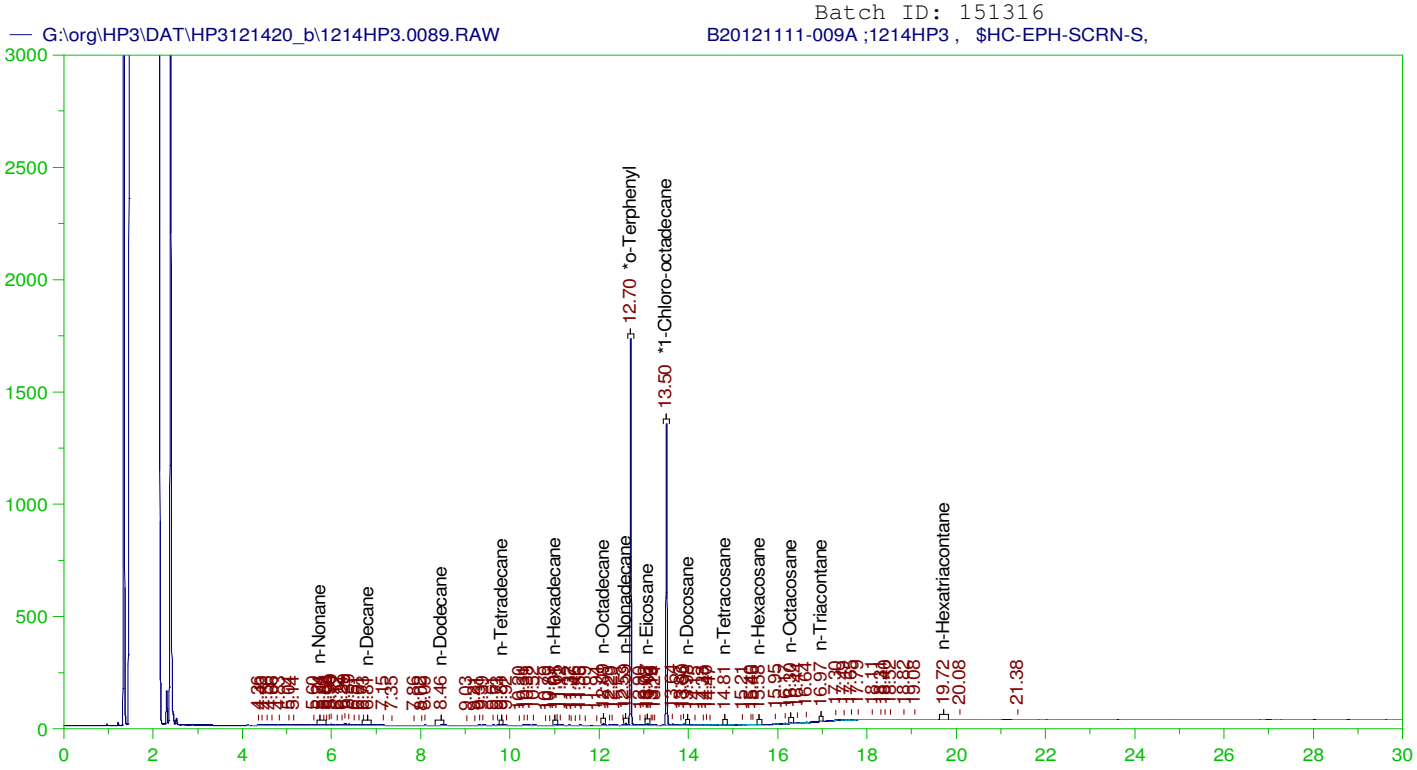
Sample Name: B20121111-008A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0088.RAW
Date & Time Acquired: 12/17/2020 3:52:36 AM
Method File: G:\Org\HP3\Methods\SR_SCN-121488-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 29.97 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.703	3014847	6.673	5.646	84.6	-
*1-Chloro-octadecane	13.503	2564688	6.673	6.185	92.69	-

DRO Area:2753132 DRO Amount: 6.103155
TEH Area:4946372 TEH Amount: 10.96514
C9-C18 Area:1147324 C9-C18 Amount: 2.576566
C19-C36 Area:3324717 C19-C36 Amount: 7.276556

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

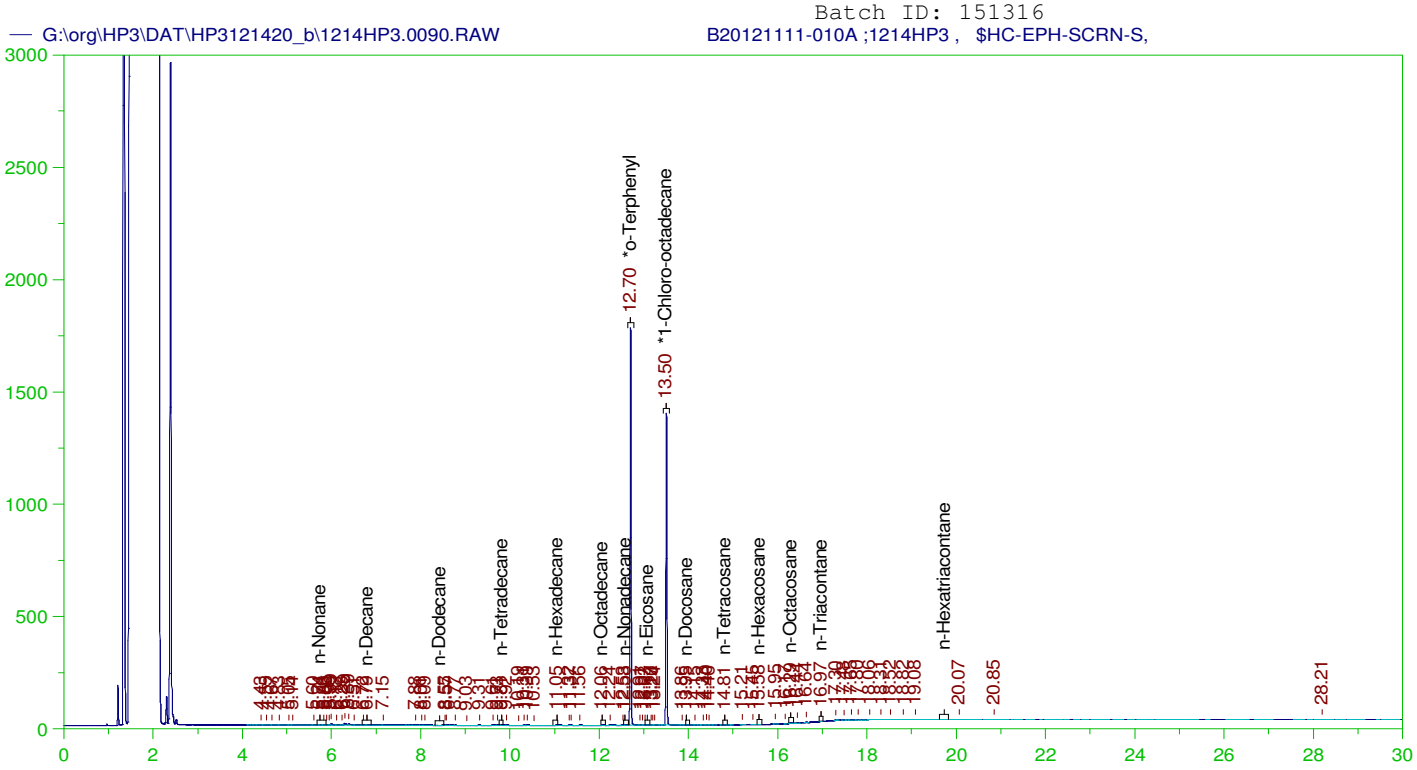
Sample Name: B20121111-009A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0089.RAW
Date & Time Acquired: 12/17/2020 4:36:36 AM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 30 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.703	2837785	6.667	5.309	79.63	-
*1-Chloro-octadecane	13.503	2359881	6.667	5.686	85.29	-

DRO Area:295061 DRO Amount: 0.6534383
TEH Area:507083 TEH Amount: 1.12298
C9-C18 Area:300670.4 C9-C18 Amount: 0.6745459
C19-C36 Area:132635 C19-C36 Amount: 0.2899978

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

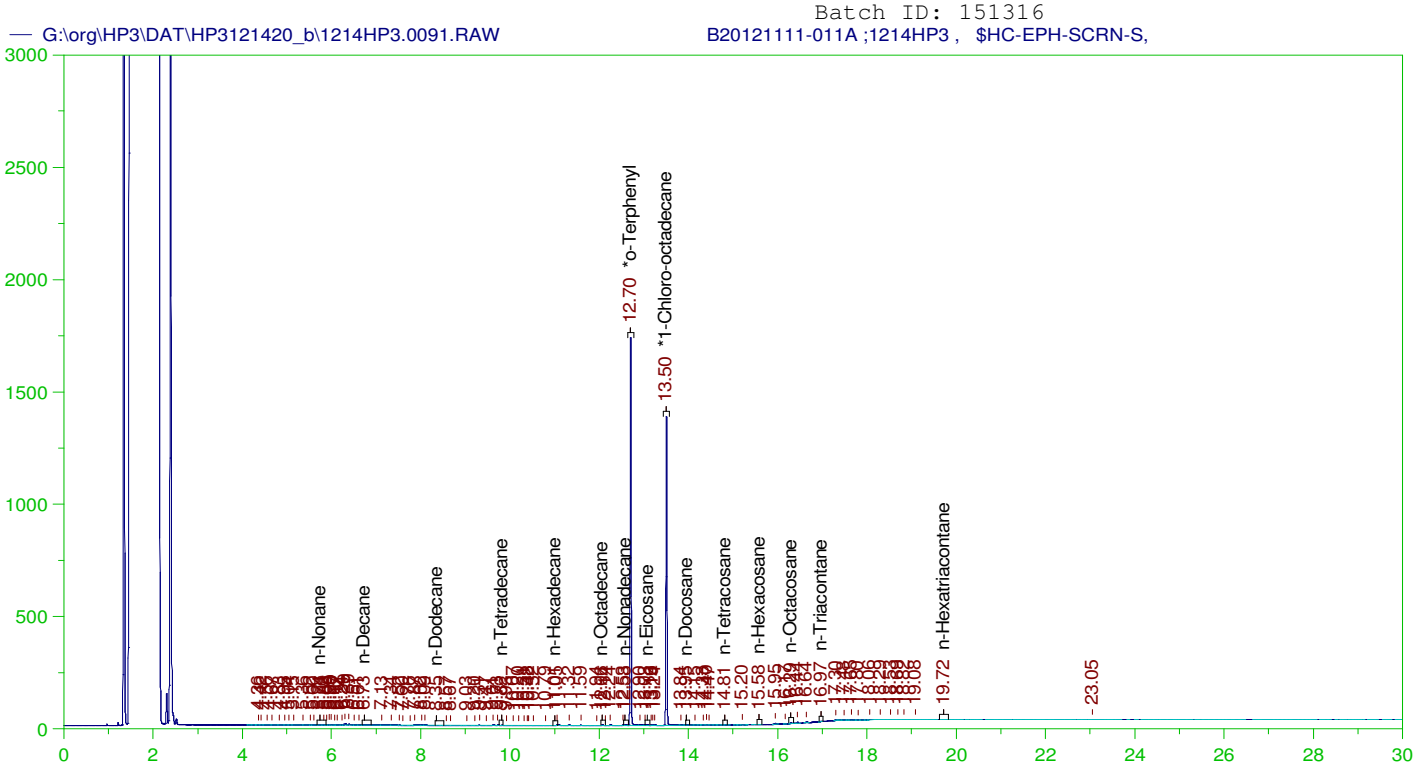
Sample Name: B20121111-010A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0090.RAW
Date & Time Acquired: 12/17/2020 5:20:43 AM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 30.02 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.702	2918952	6.662	5.457	81.91	-
*1-Chloro-octadecane	13.502	2460303	6.662	5.924	88.92	-

DRO Area:149046 DRO Amount: 0.3298554
TEH Area:363703 TEH Amount: 0.8049154
C9-C18 Area:210671.8 C9-C18 Amount: 0.4723216
C19-C36 Area:74413.5 C19-C36 Amount: 0.1625919

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

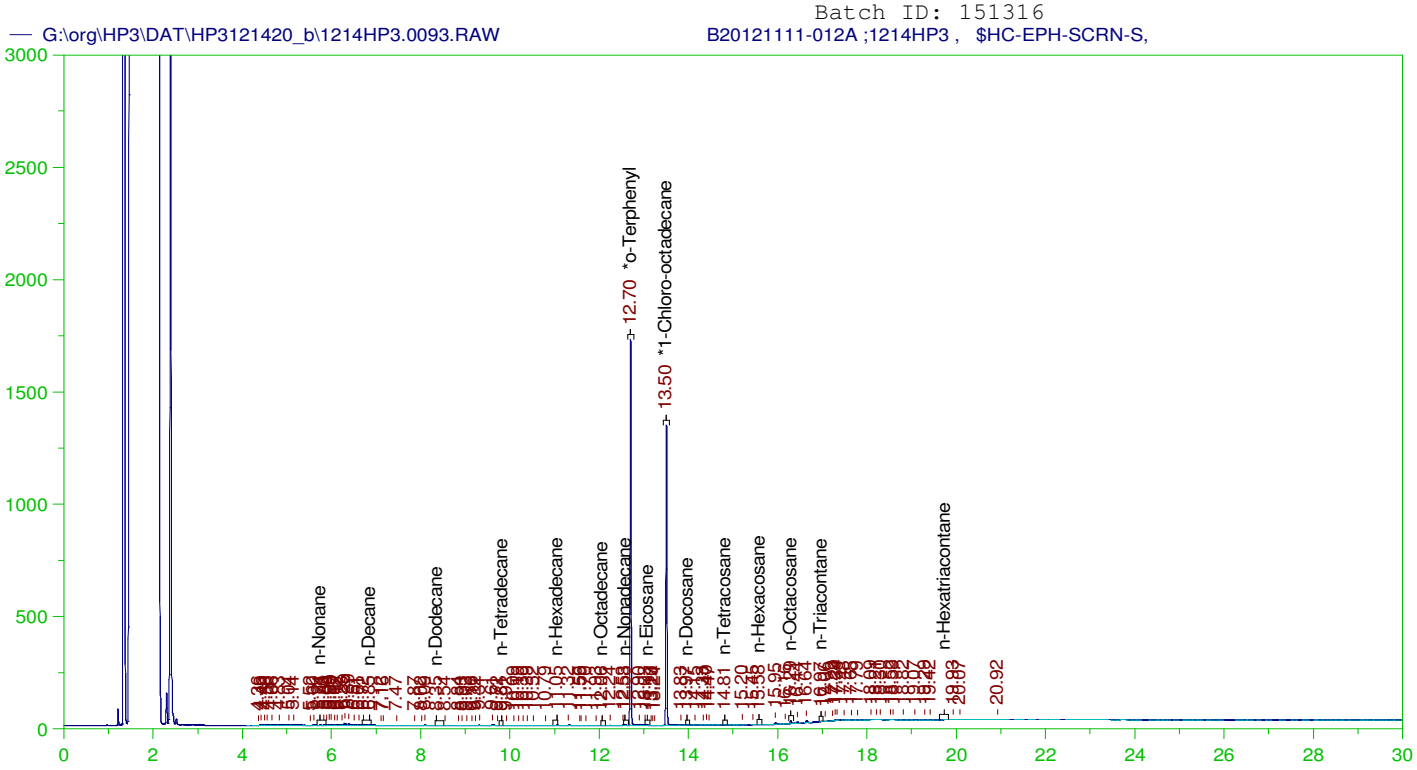
Sample Name: B20121111-011A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0091.RAW
Date & Time Acquired: 12/17/2020 6:04:46 AM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 29.98 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.703	2848579	6.671	5.332	79.93	-
*1-Chloro-octadecane	13.503	2418092	6.671	5.83	87.39	-

DRO Area:172493.3 DRO Amount: 0.3822562
TEH Area:376938.3 TEH Amount: 0.8353195
C9-C18 Area:209653 C9-C18 Amount: 0.4706647
C19-C36 Area:93526.75 C19-C36 Amount: 0.2046266

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

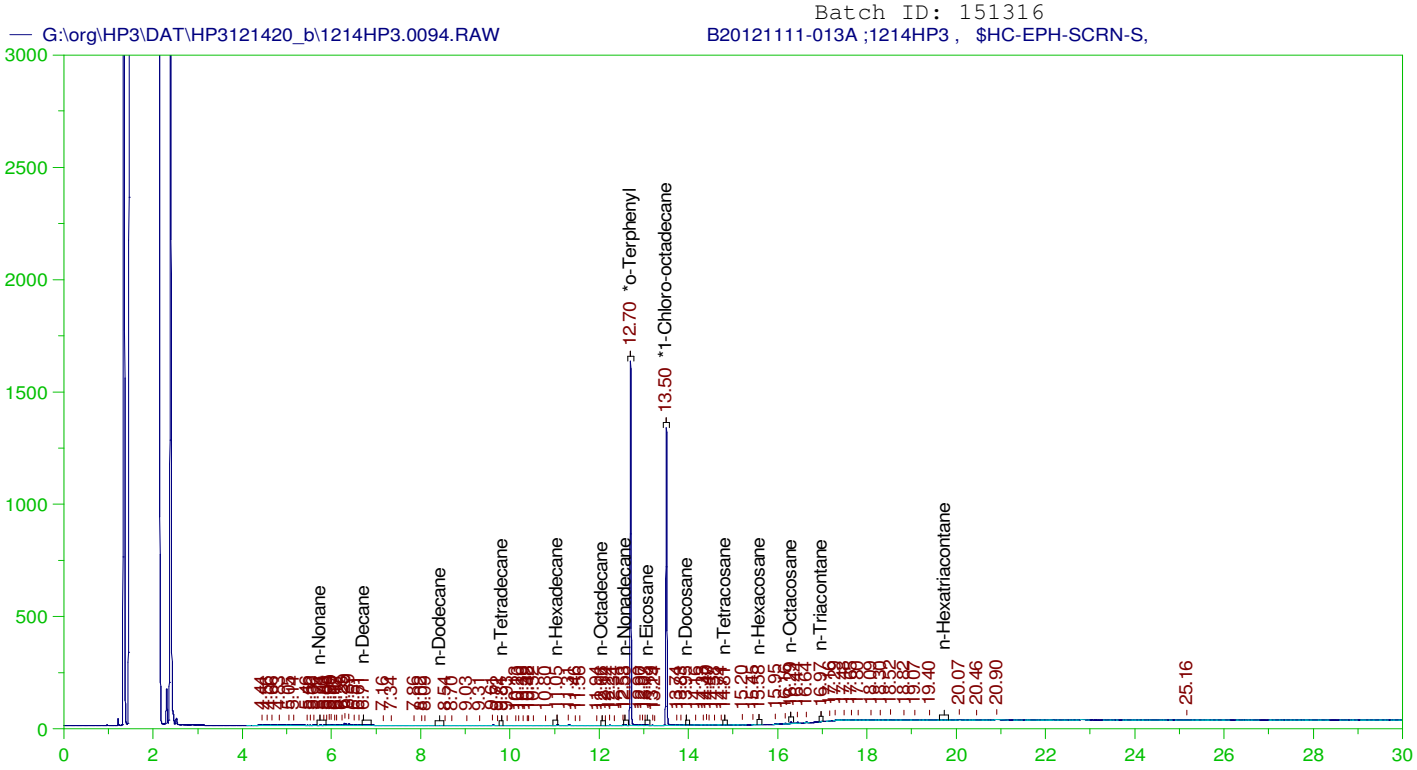
Sample Name: B20121111-012A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0093.RAW
Date & Time Acquired: 12/17/2020 7:32:32 AM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 30.01 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.702	2823309	6.664	5.28	79.22	-
*1-Chloro-octadecane	13.502	2358335	6.664	5.68	85.23	-

DRO Area:258663.8 DRO Amount: 0.5726426
TEH Area:507988.8 TEH Amount: 1.124611
C9-C18 Area:251099.5 C9-C18 Amount: 0.5631473
C19-C36 Area:173431.3 C19-C36 Amount: 0.3790698

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

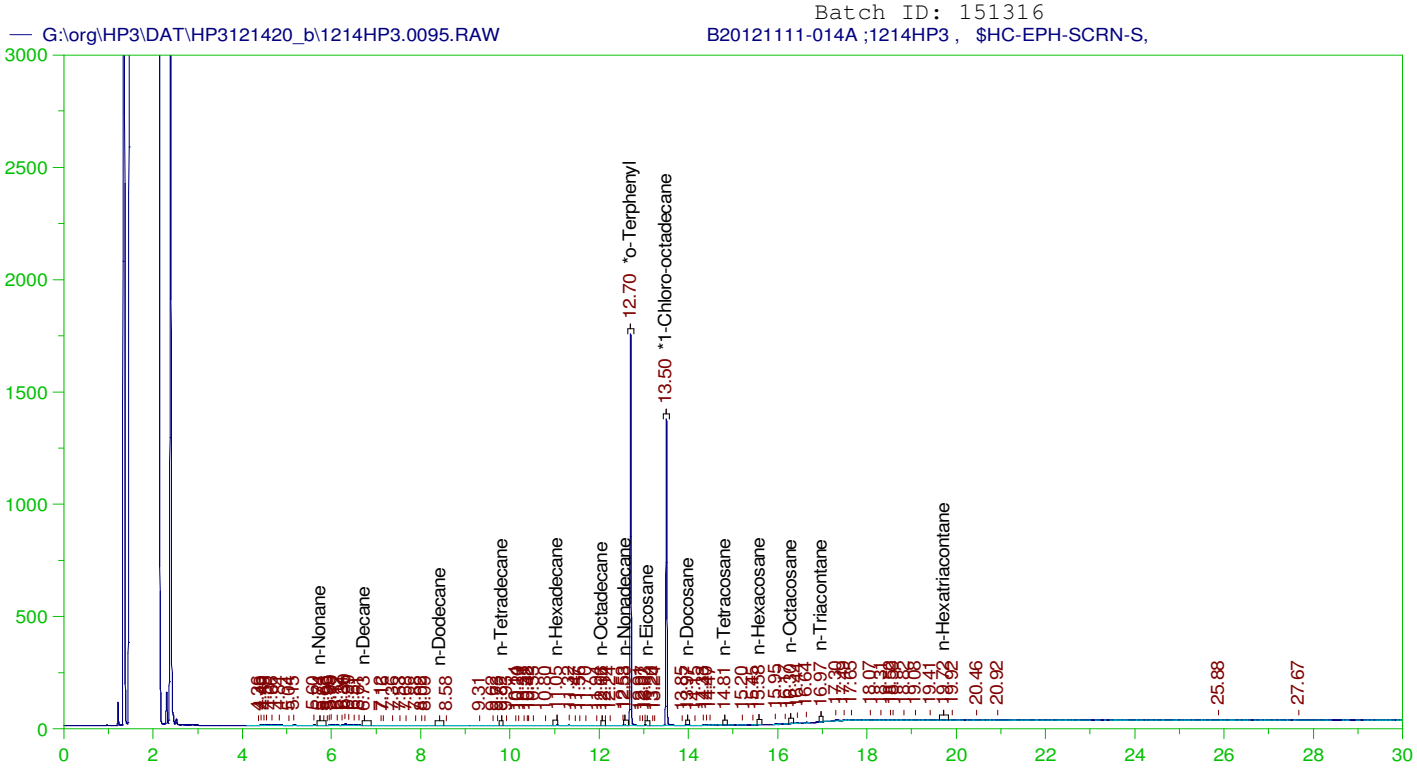
Sample Name: B20121111-013A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0094.RAW
Date & Time Acquired: 12/17/2020 8:16:37 AM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 30.03 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.701	2714507	6.66	5.073	76.17	-
*1-Chloro-octadecane	13.501	2328047	6.66	5.603	84.14	-

DRO Area:184985.3 DRO Amount: 0.4092567
TEH Area:414948.8 TEH Amount: 0.9180222
C9-C18 Area:223613.2 C9-C18 Amount: 0.501169
C19-C36 Area:109598.3 C19-C36 Amount: 0.2393901

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

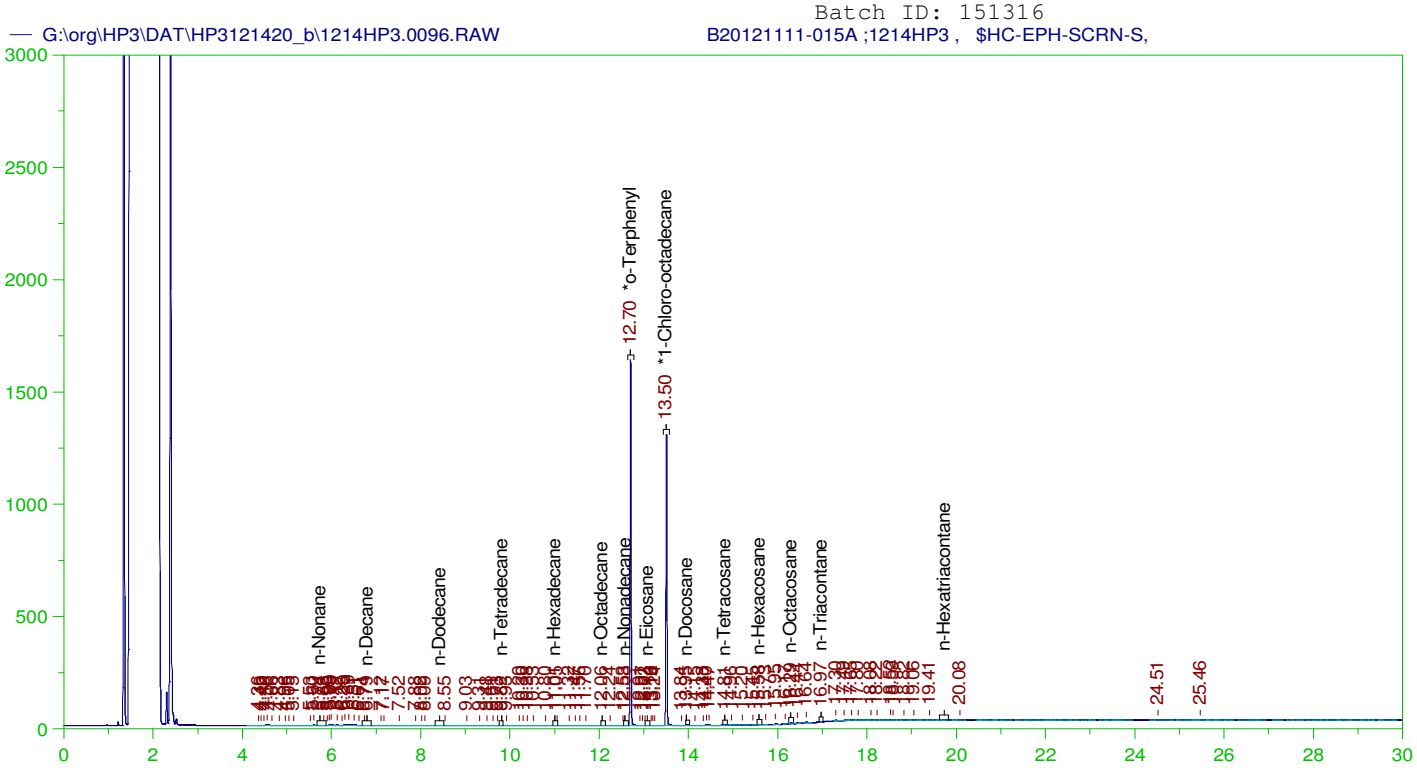
Sample Name: B20121111-014A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0095.RAW
Date & Time Acquired: 12/17/2020 9:00:20 AM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 30.01 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.702	2930638	6.664	5.481	82.24	-
*1-Chloro-octadecane	13.502	2437932	6.664	5.872	88.11	-

DRO Area:149401 DRO Amount: 0.3307513
TEH Area:375686.5 TEH Amount: 0.8317133
C9-C18 Area:188247.3 C9-C18 Amount: 0.4221871
C19-C36 Area:105378 C19-C36 Amount: 0.2303254

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

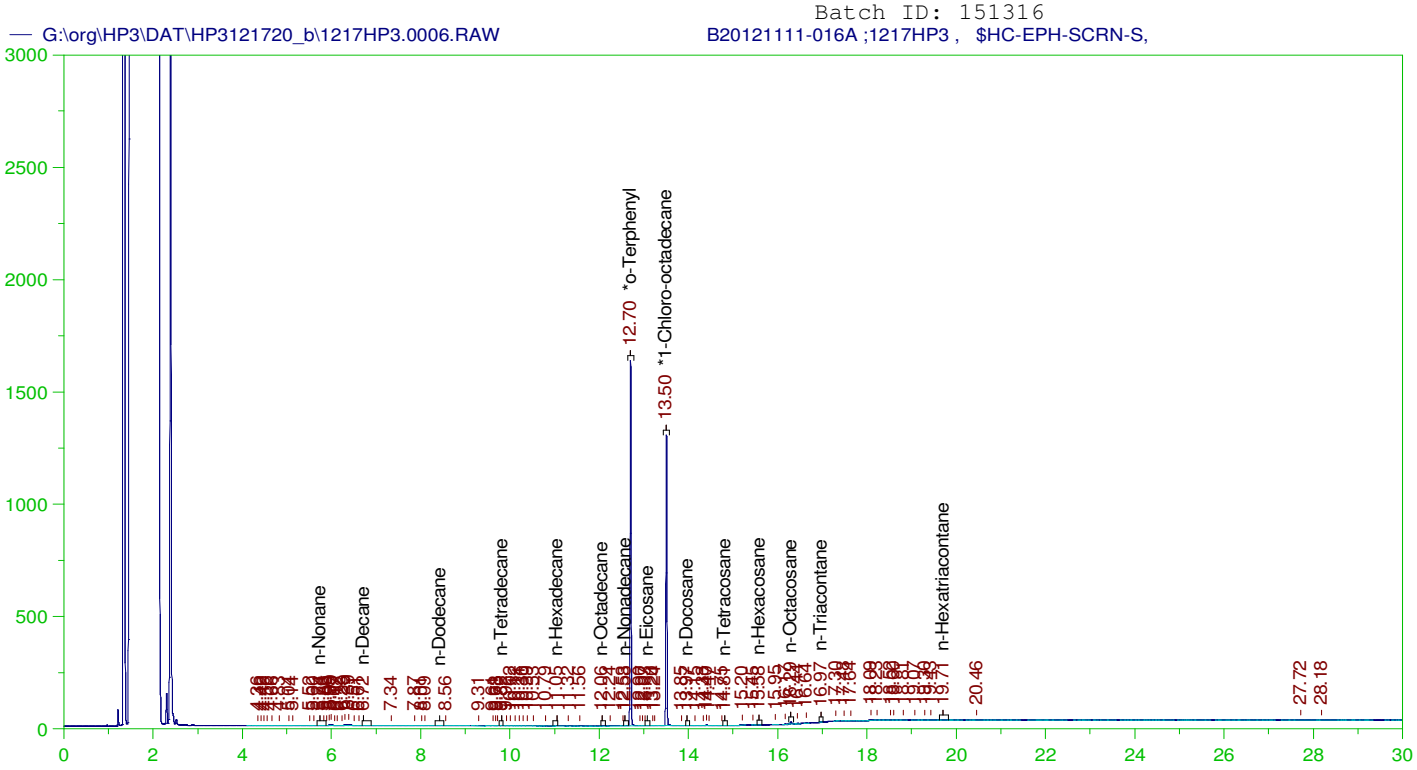
Sample Name: B20121111-015A ;1214HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121420_b\1214HP3.0096.RAW
Date & Time Acquired: 12/17/2020 9:44:13 AM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 30.04 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.702	2697952	6.658	5.04	75.71	-
*1-Chloro-octadecane	13.502	2285953	6.658	5.5	82.61	-

DRO Area:165255.8 DRO Amount: 0.365486
TEH Area:365941.3 TEH Amount: 0.8093297
C9-C18 Area:186633.2 C9-C18 Amount: 0.4181491
C19-C36 Area:106263.3 C19-C36 Amount: 0.2320283

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

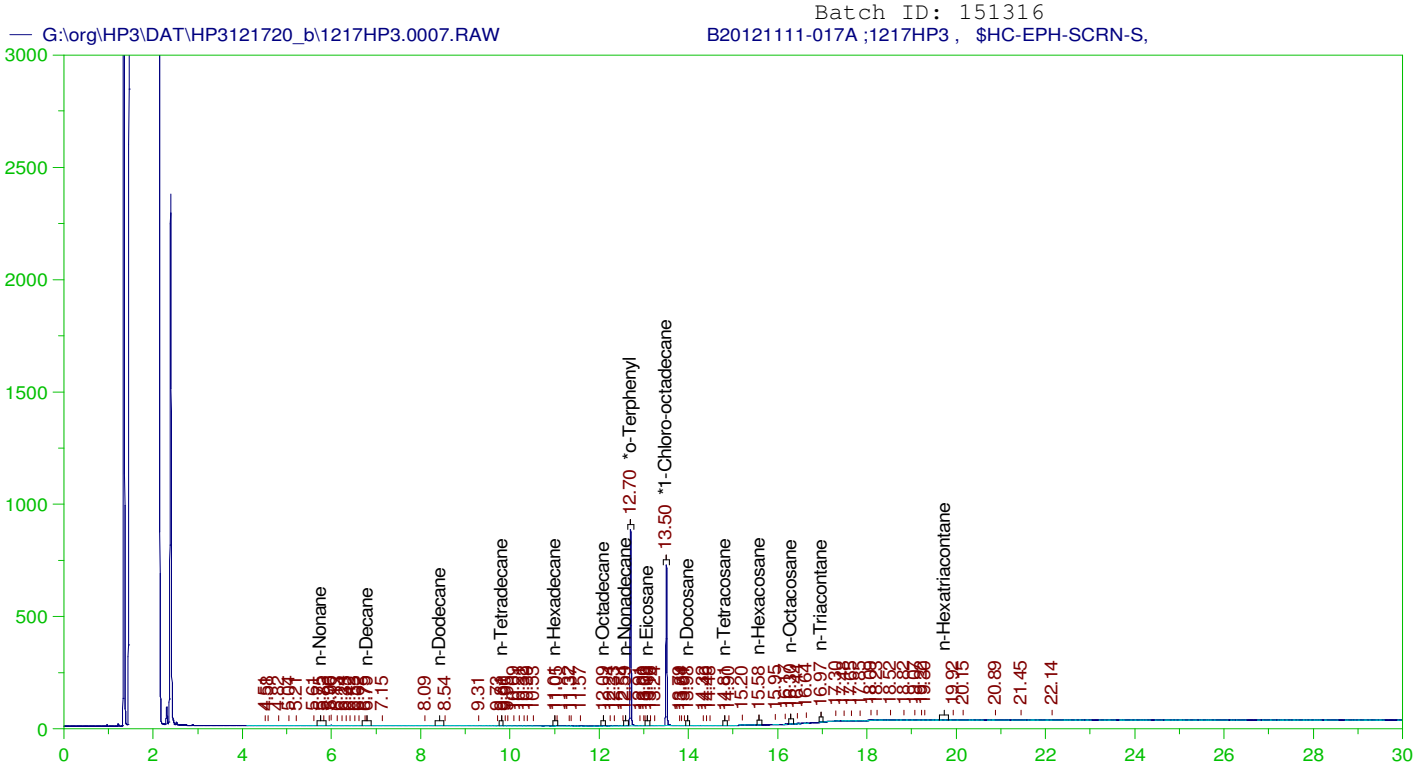
Sample Name: B20121111-016A ;1217HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121720_b\1217HP3.0006.RAW
Date & Time Acquired: 12/17/2020 2:06:53 PM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 30.04 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.701	2742356	6.658	5.123	76.95	-
*1-Chloro-octadecane	13.502	2318110	6.658	5.578	83.78	-

DRO Area:154205.3 DRO Amount: 0.3410462
TEH Area:358431.3 TEH Amount: 0.7927203
C9-C18 Area:182112.6 C9-C18 Amount: 0.4080207
C19-C36 Area:96042.25 C19-C36 Amount: 0.2097105

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

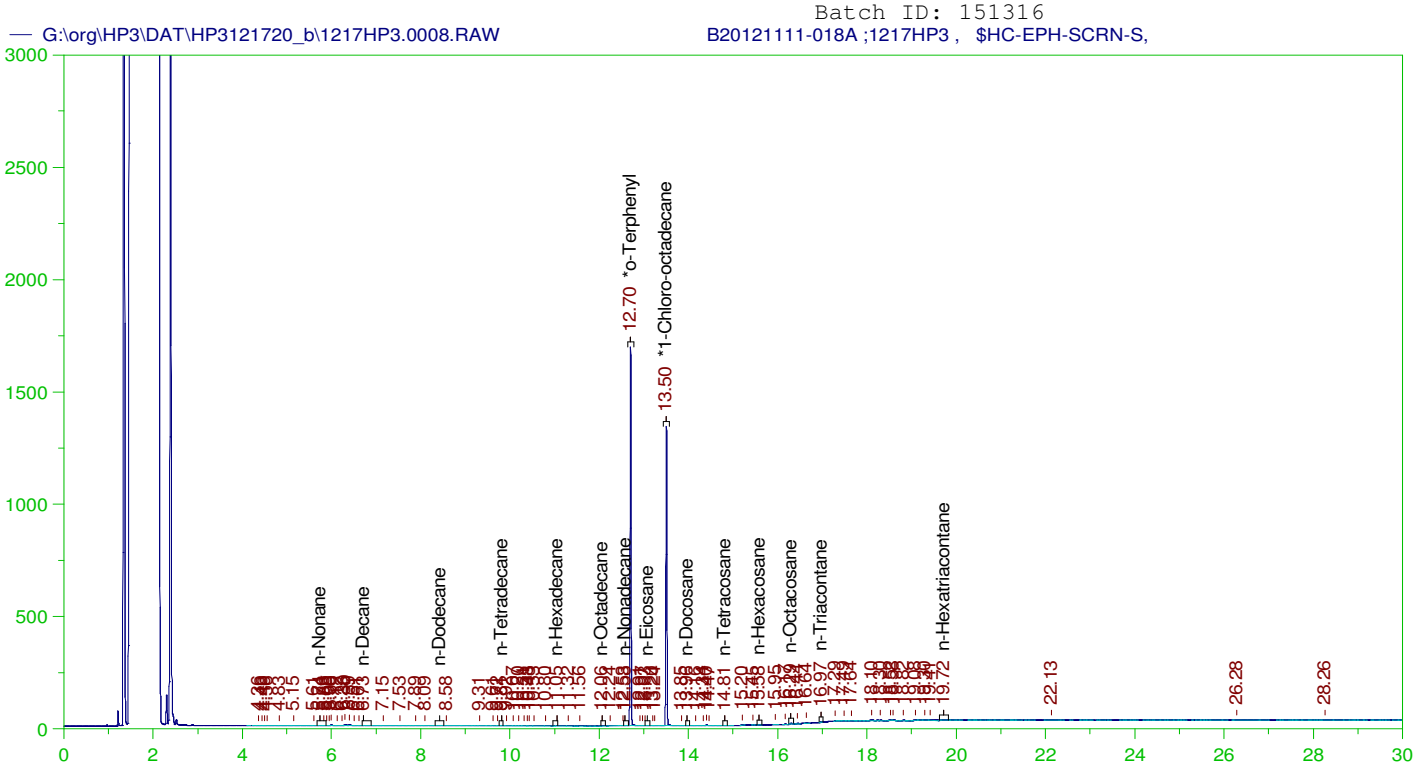
Sample Name: B20121111-017A ;1217HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121720_b\1217HP3.0007.RAW
Date & Time Acquired: 12/17/2020 2:50:31 PM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 30.01 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.702	1479799	6.664	2.767	41.52	-
*1-Chloro-octadecane	13.501	1277696	6.664	3.077	46.18	-

DRO Area:105051 DRO Amount: 0.2325671
TEH Area:221199 TEH Amount: 0.4897012
C9-C18 Area:89179.59 C9-C18 Amount: 0.2000054
C19-C36 Area:82466.25 C19-C36 Amount: 0.180247

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

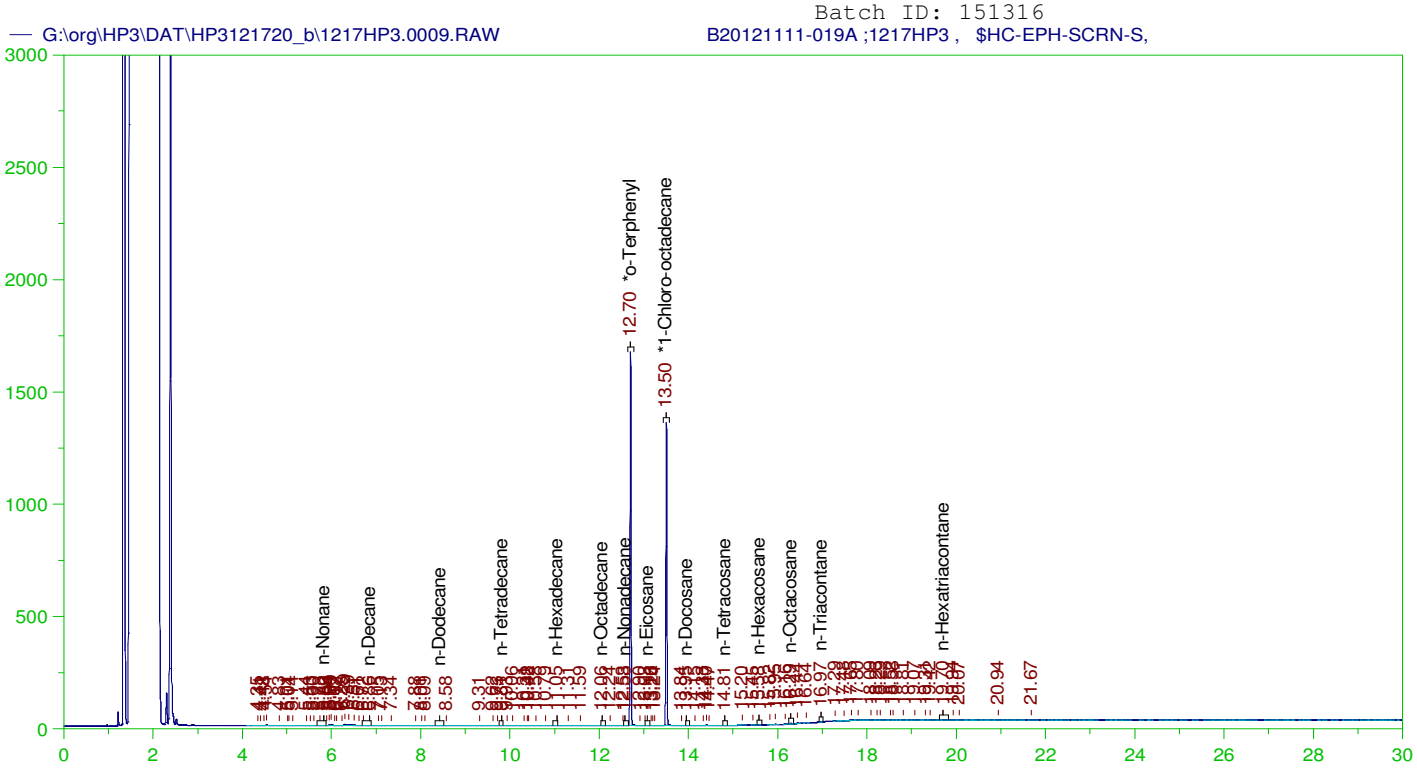
Sample Name: B20121111-018A ;1217HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121720_b\1217HP3.0008.RAW
Date & Time Acquired: 12/17/2020 3:34:09 PM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 30.04 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.701	2793721	6.658	5.219	78.39	-
*1-Chloro-octadecane	13.501	2388162	6.658	5.746	86.31	-

DRO Area:133896.8 DRO Amount: 0.2961312
TEH Area:310267.3 TEH Amount: 0.6861989
C9-C18 Area:154699.4 C9-C18 Amount: 0.3466018
C19-C36 Area:81234.75 C19-C36 Amount: 0.177378

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

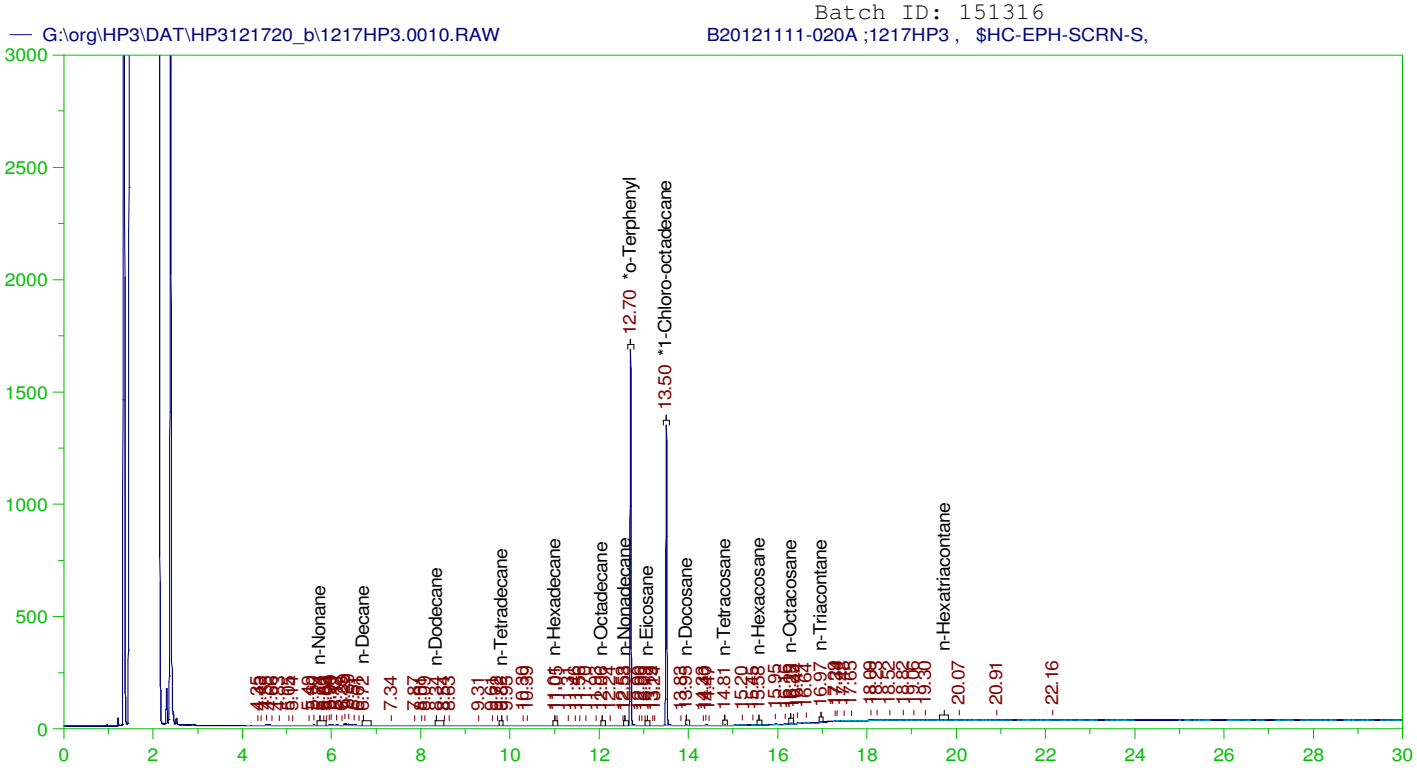
Sample Name: B20121111-019A ;1217HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121720_b\1217HP3.0009.RAW
Date & Time Acquired: 12/17/2020 4:17:47 PM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 29.96 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.7	2791313	6.676	5.229	78.33	-
*1-Chloro-octadecane	13.501	2413009	6.676	5.821	87.21	-

DRO Area:144585.5 DRO Amount: 0.3206247
TEH Area:365638.5 TEH Amount: 0.8108194
C9-C18 Area:191977.1 C9-C18 Amount: 0.4312706
C19-C36 Area:87889 C19-C36 Amount: 0.1924202

Batch ID: 151316



EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) SCREENING ANALYSIS CHROMATOGRAM

Sample Name: B20121111-020A ;1217HP3 , $HC-EPH-SCRN-S,
Raw File: G:\org\HP3\DAT\HP3121720_b\1217HP3.0010.RAW
Date & Time Acquired: 12/17/2020 5:01:14 PM
Method File: G:\Org\HP3\Methods\SR_SCN-VY-L%.met
Calibration File: G:\Org\HP3\Cals\MA-EPH_SC200129VY.CAL
Sample Weight: 30.05 Dilution: 2 S.A.: 1

Mean RF for C9 to C18 Hydrocarbons: 29715.83
Mean RF for C19 to C36 Hydrocarbons: 30491.03
Mean RF for Total Extractable Hydrocarbons: 30103.43
Rt range for Diesel Range Organics: 6.69 to 17.02
Rt range for C9 to C18 Hydrocarbons: 5.68 to 12.635
Rt range for C19 to C36 Hydrocarbons: 12.67 to 19.83

SURROGATE COMPOUND	RT	AREA	ACTUAL	MEASURED	%REC	
*o-Terphenyl	12.7	2753749	6.656	5.143	77.27	-
*1-Chloro-octadecane	13.5	2365002	6.656	5.689	85.47	-

DRO Area:156096.8 DRO Amount: 0.3451147
TEH Area:385693.8 TEH Amount: 0.8527312
C9-C18 Area:208652.7 C9-C18 Amount: 0.4673279
C19-C36 Area:98181.25 C19-C36 Amount: 0.2143098

Work Order Receipt Checklist

MT Dept of Transportation

B20121111

Login completed by:	Taylor K. Burris	Date Received:	12/11/2020
Reviewed by:	BL2000\gmccartney	Received by:	dac
Reviewed Date:	12/15/2020	Carrier name:	Hand Del

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	4.0°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

None

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Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	Montana Department of Transportation
Contact	Doug Compton
Phone	(406) 202-3094
Mailing Address	2701 Prospect Ave
City, State, Zip	Helena MT 59620
Email	dcompton@mt.gov
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	
Bottle Order	147695

Report Information (if different than Account Information)

Company/Name	WCEC
Contact	Bryce Pewonka
Phone	406 252 3022
Mailing Address	455 Moore Ln # 2
City, State, Zip	Billings MT 59101
Email	bpewonka@wcec.com
Receive Report	☐Hard Copy ☒Email
Special Report/Formats	☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other

Comments

Project Information

MDT Billings Bypass Project

Project Name, PWSID, Permit, etc.	I-90 / Johnson Ln Interchange
Sampler Name	B. Pewonka
Sampler Phone	406 252 3022
Sample Origin State	MT
EPA/State Compliance	☐ Yes ☐ No

URANIUM MINING CLIENTS MUST indicate sample type.
☐ NOT Source or Byproduct Material
☐ Source/Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11e.(2) Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	EPH	VPH	See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
1	SB1	12/9/20	1215	2	S	X	X			B2012 1111
2	SB2		1330			X	X			
3	SB3		1400			X	X			
4	SB4		1435			X	X			
5	SB5		1505			X	X			
6	SB6		1527			X	X			
7	SB7	12/10/20	0950			X	X			
8	SB8		1035			X	X			
9	SB9		1117			X	X			
10	SB10		1140			X	X			

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	BRYCE PEWONKA	12/11/20 1451				
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
				Taylor Chirnick	12/11/20 14:51	

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ENERGY
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Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	MT Department of Transportation
Contact	Doug Compton
Phone	(406) 202-3094
Mailing Address	2701 Prospect Ave
City, State, Zip	Helena MT 59620
Email	dcompton@mt.gov
Receive Invoice	☐ Hard Copy ☒ Email ✓
Receive Report	☐ Hard Copy ☒ Email
Purchase Order	
Quote	
Bottle Order	147695

Report Information (if different than Account Information)

Company/Name	WCEC
Contact	Bryce Pewonka
Phone	406 252 3022
Mailing Address	455 Moore Ln #2
City, State, Zip	Billings MT 59101
Email	bpewonka@wcec.com
Receive Report	☐ Hard Copy ☒ Email
Special Report/Formats	☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other

Comments

Project Information

MDT Billings Bypass Project

Project Name, PWSID, Permit, etc.	I-90 / Johnson Ln Interchange
Sampler Name	B. Pewonka
Sampler Phone	406 252-3022
Sample Origin State	MT
EPA/State Compliance	☐ Yes ☐ No

URANIUM MINING CLIENTS MUST indicate sample type.
☐ NOT Source or Byproduct Material
☐ Source/Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11e.(2) Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

Analysis Requested

All turnaround times are standard unless marked as RUSH

Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	EPH	VPH	See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
1	SB11	12/10/20	1330	2	S	X	X			B20121111
2	SB12		1400			X	X			
3	SB13		1430			X	X			
4	SB14		1515			X	X			
5	SB15		1545			X	X			
6	SB16		1625			X	X			
7	SB17	12/11/20	1030			X	X			
8	SB18		1100			X	X			
9	SB19		1145			X	X			
10	SB20		1210			X	X			

TB 10/7/2020 BP MMS 07 RC RB 12/11/2020

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	BRYCE PEWONKA	12/11/20 1451				
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
				Ethan Christensen	12/11/20 14:51	

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check	Amount $	Receipt Number (cash/check only)

Page 90 of 90

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

Montana DEQ - Waste Management and Remediation Division

Data Validation Summary Form (Version 1.3.0, Revised 1/26/18)

Please fill out the information below, using one form for each lab batch (one form can be used for multiple analytical methods). The form will grow and adjust, based on your responses. Please include a discussion regarding the sampling event in the report that is sent to DEQ with this form. For additional instructions, please click the Open Complete Instructions button.

Open Complete Instructions

Basic Questions View example (Note: example optimized for viewing in Chrome browser)

1. Site/Facility name	Billings Bypass Project I-90/Johnson Lane Interchange
2. Site code or facility ID (if applicable)	
3. Release ID (if applicable)	
4. Sample delivery group	B20121111
5. Name of DEQ-approved sampling plan	
6. Date DEQ approved the sampling plan	M/D/YY
7. Name of data validator	Bryce Pewonka
8. Phone	406.252.3022
9. Date validated	1/5/2021 M/D/YY

Field Collection Questions View example (Note: example optimized for viewing in Chrome browser)

10. Sample matrix	☒ Soil ☐ Sediment ☐ Surface water ☐ Groundwater ☐ Tap water ☐ Air (including soil gas) ☐ Other
11. Sample collection start date	12/9/2020 M/D/YY
12. Sample collection end date	12/11/2020 M/D/YY

13. Analytical methods used

Use Add Method button to list multiple methods. Enter any other methods in the field manually.

Add Method	Analytical Method(s)
Delete Method	Method MT-EPH: Extractable Petroleum Hydrocarbons
Delete Method	Method MT-VPH: Volatile Petorleum Hydrocarbons

Laboratory-related Questions View example (Note: example optimized for viewing in Chrome browser)

14. Laboratory name and location	Energy Laboratories, Inc. - Billings, Montana
15. Laboratory project ID	MDT Billings Bypass Project I-90/Johnson Ln Interc

16. Were samples received in good condition and at appropriate temperature, chain-of-custody forms complete, and all samples analyzed within holding times?	Yes ◉	No ○	See Below ○	Comments
17. Were all laboratory quality control procedures complied with and is data validated without qualifiers?	Yes ○	No ○	See Below ◉	Comments

Please explain

J = estimated value, analyte was present but less than the reporting limits

	Yes	No	Comments
17a. Were all calibration verification results within acceptable limits?	●	○	
17b. Were laboratory (method) blank samples free of contamination?	●	○	
17c. Are the percent recoveries and relative percent differences of matrix spike and matrix spike duplicates within quality control limits?	●	○	
17d. Are the laboratory control samples the same matrix as the samples and prepared the same as associated samples?	●	○	
17e. Were laboratory control samples and laboratory control sample duplicate percent recoveries and relative percent differences within laboratory contro limits?	●	○	
17f. Were surrogate recoveries within laboratory quality control limits?	●	○	
17g. Were the laboratory duplicate relative percent differences within data validation quality control limits?	●	○	
18. Were the total number of lab method blanks at least 5% of the total number of samples, or as required by the method?	●	○	
19. Were the total number of lab matrix spike samples prepared at least 5% of the total number of samples, or as required by the method?	●	○	

20. Please list any project samples used for matrix spike/matrix spike duplicates.

Add Sample	Lab ID	Field Sample ID	Comments
Delete Sample			

	Yes	No	Comments
21. Is the total number of laboratory control samples at least 5% of the total number of samples?	●	○	

Consultant/Validator Questions View example (Note: example optimized for viewing in Chrome browser)

	Yes	No	Comments
22. Are the detection limits appropriate for the project (i.e. at or below screening levels)?	●	○	
23. Are the reported units appropriate for the sample matrix (i.e. water results in ug/L, not mg/kg)?	●	○	
24. Do the analytical methods comply with project requirements (e.g. in the SAP, work plan, or QAPP)?	●	○	

25. Do the laboratory reports include all constituents requested to be analyzed on the chain-of-custody or under the sampling plan or other applicable document?	Yes (●)	No ( )		Comments
26. Is the number of sample blanks (e.g. equipment, trip, or field blanks) equal to at least 10% of the total number of samples, or as otherwise required?	Yes (●)	No ( )		Comments
27. Are field blanks free from contamination, duplicates collected as required, and field duplicate percent differences within data validation quality control limits?	Yes (●)	No ( )	See Below ( )	Comments

28. Please provide an Excel or CSV file to the DEQ project manager (via e-mail or CD) that lists all samples evaluated in this summary and lists any qualified data.
Please use the following format:

Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Example 48310-2.31E	Example GW-1	R	Sample dropped in lab and unrecoverable
Example 48310-2.32D	Example GW-2		

Please use the following format for qualifiers. See EPA's National Functional Guidelines for more information on qualifiers for unique samples such as dioxins.

Qualifier	Explanation
C	Pesticide and Arochlor results confirmed with GC/MS
J-	Estimated value, may be biased low
J	Analyte identified, but concentration is estimated
J+	Estimated value, may be biased high
NJ	Tentatively identified compound
R	Sample result rejected
U	Analyte analyzed for, but not detected above quantitation limit
UJ	Analyte not detected above CRQL, but CRQL may be inaccurate
X	Pesticide and Arochlor results attempted using GC/MS, but unsuccessful

If you wish to manually enter qualified sample results, please use the table below.

Add Sample	Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Delete Sample				

29. What is the percent completeness (samples planned versus valid samples collected)?	100		Comments
30. Was the completeness goal met?	Yes (●)	No ( )	Comments
31. Does all data conform to analytical methods and data quality objectives specified for this project?	Yes (●)	No ( )	Comments

32. Other general comments or observations?

Split Samples

33. Did DEQ collect split samples?	Yes	No	Comments
	◯	◯	

Print Form | Save As | Open Instructions | Hide Instructions

Montana Department of Environmental Quality
Data Validation Guidelines for Evaluating Analytical Data
(updated January 26, 2018)

This document was assembled by the Montana Department of Environmental Quality Contaminated Site Cleanup Bureau (DEQ) to formalize technical direction for conducting data validation. Data validation is a standardized review process for judging the analytical quality and usefulness of a discrete set of chemical data and is necessary to ensure that data of known and documented quality are used in making environmental decisions.

While these guidelines are generally used by DEQ, there may be circumstances that warrant a higher level of data validation review and DEQ reserves the right to require additional validation. For investigations where x-ray fluorescence (XRF) or other field screening equipment is used, provide an evaluation including the comparison and correlation of field screening data to laboratory confirmation data in the data validation discussion (please see DEQ's frequently asked questions at http://deq.mt.gov/Land/StateSuperfund/FrequentlyAskedQuestions for specifics associated with the use of XRF equipment and data collection/evaluation).

Please complete a separate data validation report for each sample batch as determined by the laboratory (Note: large data collection events may result in multiple batches). A brief summary of this validation report and the acceptability and usability of the data should be included in the text of the project report with the validation report included as an appendix. The data validation should include an assessment of data using the precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters:

Precision: The degree of mutual agreement between individual measurements of the same property under similar conditions.

Combined field and laboratory precision is evaluated by collecting and analyzing field duplicates and then calculating the variance between the samples, typically as a relative percent difference (RPD). Laboratory analytical precision is evaluated by analyzing matrix spike/matrix spike duplicate (MS/MSD) samples and using the results to calculate an RPD.

Accuracy: The degree of agreement between an analytical measurement and a reference accepted as a true value.

The accuracy of a measurement system can be affected by errors introduced by field contamination, sample preservation, sample handling, sample preparation, and analytical techniques. Analysis of matrix spike/matrix spike duplicate (MS/MSD) samples, laboratory control spikes (LCS) or blank spikes, surrogate standards, and method blanks are typically used to calculate the percent recovery (%R) for evaluating accuracy.

Please note that some methods, such as EPH and VPH, require calibration data. For such methods, please provide and verify the calibration data.

Representativeness: The degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter at a sampling point, or an environmental condition that they are intended to represent.

Typically, representative data will be obtained through careful selection of sampling locations and analytical parameters; proper collection and handling of samples; and through use and consistent application of established field and laboratory procedures. Evaluation of field and laboratory blank samples for presence of contaminants can be useful in evaluating representativeness of sample results.

Completeness: A measure of the percentage of project-specific data that is valid.

Valid data are obtained when samples are collected and analyzed in accordance with quality control (QC) procedures outlined in the sampling and analysis plan (SAP), and when none of the QC criteria that affect data usability are exceeded. Once data validation is complete, the number of usable sample results is divided by the total number of sample results planned for the investigation to determine the percent completeness. A completeness goal should be developed for each project (i.e., 100% completeness for residential samples to ensure that all properties requiring sampling are sampled). A discussion of completeness must also examine the number of samples called for in the SAP compared to the number of samples actually collected. Variance between the planned and collected sample numbers should be explained.

Comparability: Expression of the confidence with which one data set can be compared with another.

Comparability of data is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data.

For complete information regarding data validation, please see the EPA National Functional Guidelines at http://www2.epa.gov/clp/contract-laboratory-program-national-functional-guidelines-data-review

Determination of Data Usability Qualifiers

Step 1: Review QC Parameter and Document Finding	Step 2: Determine Which Samples to Qualify	Step 3: Determine Which Results to Qualify	Step 4: Apply Qualifier and Bias Code
Lab Receipt of Samples			
Preservative (including sample temperature) outside of specifications.	Affected samples and professional judgment	Detected Results Non-detected Results	J- UJ or R
Samples not accounted for on Chain-of-Custody	Affected samples	All samples	R
Samples analyzed outside of method specified or technical holding time.	Affected samples	Detected Results Non-detected Results	J- R (UJ for SVOC, pesticides, aroclors)
Samples analyzed grossly outside of method specified or technical holding time.	Affected samples	Detected Results Non-detected Results	J- R
Lab Quality Control			
Calibration verification results outside of acceptable limits.	Samples associated with initial and/or continuing calibration verification	Detected Results Non-detected Results	J UJ
Analyte detected in Method Blank (MB) at concentration less than Contract Required Quantitation Limit (CRQL)[1] (i.e. , J-flag)	Samples in preparation batch	Detected Results <=CRQL Detected Results >CRQL	U J (use professional judgment)
Analyte detected in Method Blank (MB) at concentration greater than or equal to CRQL	Samples in preparation batch	Detected Results < Blank Concentration Detected Results >= Blank Concentration	U Use professional judgment
Matrix Spike:			
%Recovery above specifications	Sample and professional judgment for samples in preparation batch from same matrix.	Detected Results Non-detected Results	J+ No qualifier

Step 1: Review QC Parameter and Document Finding	Step 2: Determine Which Samples to Qualify	Step 3: Determine Which Results to Qualify	Step 4: Apply Qualifier and Bias Code
%Recovery below specifications and greater than 20% (30% for inorganics)	Sample and professional judgment for samples in preparation batch from same matrix.	Detected Results Non-detected Results	J- UJ
%Recovery below 20% (30% for inorganics)	Sample and professional judgment for samples in preparation batch from same matrix.	Detected Results Non-detected Results	J- R
Note: If the spiking amount is less than four times the result in the unspiked parent sample, the MS/MSD data may not represent the matrix effect. Professional judgment should be use in evaluating and qualifying the data.			
Laboratory Control Sample:			
%Recovery above specifications	Samples in preparation batch.	Detected Results Non-detected Results	J+ No qualifier
%Recovery below specifications and greater than 20% (40% for inorganics; see NFG for pesticides and Aroclors; 10% for dioxins)	Samples in preparation batch.	Detected Results Non-detected Results	J- UJ
%Recovery below 20% (40% for inorganics; see NFG for pesticides and Aroclors; 10% for dioxins)	Samples in preparation batch.	Detected Results Non-detected Results	J- R
Laboratory Duplicate Samples (including LCSD and MSD):			
Relative Percent Difference outside specifications	Samples in preparation batch.	Detected Results	J
Surrogate Recoveries:			
Surrogate Recovery greater than Upper Acceptance Limit	Target analytes in sample	Detected Results Non-detected Results	J+ No qualification (UJ for dioxins)
Surrogate Recovery less than Lower Acceptance Limit and greater than 10%	Target analytes in sample	Detected Results Non-detected Results	J- UJ
Surrogate Recovery less than 10%	Target analytes in sample	Detected Results Non-detected Results	J- R (see NFG for dioxins)
Field QC Samples			
Blanks			
Analyte detected in Field Blank, Equipment Blank, and/or Trip Blank at concentration less than Contract Required Quantitation Limit (CRQL)1 (i.e. , J-flag)	Associated samples	Detected Results <CRQL Detected Results >=CRQL	U Use professional judgment
Analyte detected in Field Blank, Equipment Blank, and/or Trip Blank at concentration greater than or equal to CRQL	Associated samples	Detected Results < Blank Concentration Detected Results >= Blank Concentration	U Use professional judgment
Duplicates			

Step 1: Review QC Parameter and Document Finding	Step 2: Determine Which Samples to Qualify	Step 3: Determine Which Results to Qualify	Step 4: Apply Qualifier and Bias Code
Field Duplicate Relative Percent Difference outside specifications and analyte concentration >=5x CRQL	Associated samples	Detected Results	J
Field Duplicate Relative Percent Difference outside specifications and analyte concentrations <5x CRQL with absolute difference between sample and duplicate > CRQL	Associated samples	Detected Results Non-detected Results	J UJ
Field Duplicate Relative Percent Difference outside specifications and analyte concentrations <5x CRQL with absolute difference between sample and duplicate <= CRQL	Associated samples	Detected Results Non-detected Results	No qualification No qualification
Consultant/Validator Questions			
Reported Units not appropriate for sample matrix	Affected samples	All results	Inquire, document, and use professional judgment
Analytical methods do not comply with project requirements. And/Or Detection Limits not appropriate for the project.	Affected samples	Detected Results Non-detected Results	Use professional judgment Use professional judgment, if Reporting Limits > Screening Levels; results may not be usable
QC Sample Frequency			
Method Blanks analyzed less than 5% of total samples	Use professional judgment	Use professional judgment	Inquire, document, and use professional judgment
Matrix Spike samples analyzed less than 5% of total samples	Use professional judgment	Use professional judgment	Inquire, document, and use professional judgment
Laboratory Control Samples analyzed less than 5% of total samples	Use professional judgment	Use professional judgment	Inquire, document, and use professional judgment
Field, equipment, or trip blanks analyzed less than required	Use professional judgment	Use professional judgment	Inquire, document, and use professional judgment

Notes:

1. See the National Functional Guidelines (NFG) for contract required quantitation limit (CRQL) or blank results of common laboratory contaminants, including: methylene chloride, acetone, and 2-butanone.

2. Screening Levels (SLs) is a generic term which may include Risk Based Screening Levels, Regional Screening Levels, and/or site specific screening levels.

Attachment 6: Johnson Lane Interchange Asbestos Survey Report

NORTHERN
INDUSTRIAL HYGIENE, INC.
Billings, MT ♦ Helena, MT

201 South 30th Street
Billings, Montana 59101
Phone: 406/245-7766
FAX: 406/254-1428

February 12, 2021

Ms. Emily Peterson
Environmental Manager
Dowl
1300 Cedar Street
Helena, MT 59601

RE: Asbestos Survey of Johnson Lane Interchange Bridges
Interstate I-90 Eastbound and Westbound, Billings, Montana
Northern Project Number 999-4161

Dear Ms. Peterson:

This letter report provides the summarized results of the asbestos survey conducted by Greg Brownell (MTA-5502, expires 04/10/2021) of Northern Industrial Hygiene, Inc. (Northern) on January 28, 2021 of the above referenced bridges. The survey was conducted to identify potential hazardous materials (asbestos) that may be present in the bridge building materials prior to the demolition of the eastbound and westbound bridges.

Overview of Facility

The bridges identified as the Johnson Lane Interchange Bridges are located on Interstate-90 between mile-markers 455 westbound and eastbound. The bridges feature concrete pilings and trusses, concrete decking, steel guard rails fastened to road deck over elastomeric pads, asphalt paving, tar, and silver paint.

Asbestos Overview

Asbestos is a trade name for a group of fibrous naturally occurring minerals that were used widely in building materials because of its ability to bind, resist chemicals, insulate, and fireproof. Exposure to elevated levels of asbestos fibers has been documented to cause a variety of diseases including asbestosis and cancer. Consequently, the application, removal, and disposal of asbestos-containing materials are regulated by several agencies.

Asbestos in most building materials poses little threat to human health as long as the asbestos fibers are securely bound within the building material. However, as the materials deteriorate because of time or exposure, or are disturbed because of human or other activities, the potential increases for the fibers to become airborne. When this occurs, the risk to human health increases significantly when the fibers are inhaled.

Occupational Safety and Health Administration (OSHA) regulations, (29 CFR Parts 1910 and 1926) define an asbestos-containing material as:

- Any material that contains more than one percent asbestos and also defines certain high-risk materials, which are presumed to contain asbestos, as Presumed Asbestos-containing Materials (PACM). The PACM designation applies to thermal system insulation, sprayed-on or troweled on surfacing material and debris where such material is present. The PACM terminology was added to ensure compliance with the hazard communication provisions of the laws and specifically for buildings constructed prior to 1980.

The National Emissions Standards for Hazardous Air Pollutants (NESHAP), (40 CFR, Part 61, Subpart M) defines regulated asbestos containing material (RACM) as follows:

- Friable asbestos-containing material containing more than one percent asbestos, which has been applied on ceilings, walls, structural members, piping, duct work, or any other part of a building, which when dry, may be crumbled, pulverized, or reduced to powder by hand pressure. The term includes non-friable asbestos-containing materials after it becomes damaged, by any means, such that when dry, it may be crumbled, pulverized, or reduced to powder by hand-pressure.

Asbestos Survey Procedures

Sampling Procedures

The asbestos survey was conducted using the applicable portions of the currently recognized standard protocol developed for schools under AHERA, as promulgated in Title 40, Code of Federal Regulations (40 CFR), Part 763 and as amended in the Federal Register and as established in the Administrative Rules of Montana (ARM 17.74.354). Since the primary concern for this investigation was to identify potential asbestos hazards in each of the two bridges, Northern's representative visually inspected existing conditions in those bridges considering each construction, addition, or renovation date as separate, unique facilities, if applicable.

Laboratory Analysis of Bulk Asbestos Samples

Bulk samples collected during the inspection were assigned bulk sample numbers and entered on sample summary/chain-of-custody forms. The samples were submitted to the laboratory by overnight courier under standard chain-of-custody procedures. The analysis was conducted in accordance with EPA Method 600/R-93/116, which employs polarized light microscopic techniques with dispersion staining for identification of mineral forms of asbestos. The quantification of asbestos in the sample is intended to be an estimate only and the limit of detection for this method is approximately 1% by volume.

Asbestos Survey Findings

A total of five (5) building materials suspected to contain asbestos were identified in the east and westbound bridges. The materials were sampled following sample collection requirements outlined under EPA, AHERA legislation and State of Montana regulations.

Laboratory results indicated that **none** of the sampled materials contain asbestos.

For additional information regarding each bridge refer to the four attached laboratory reports.

Conclusions and Recommendations

Asbestos was **not detected** in any of the suspect materials sampled and analyzed. Therefore, Northern offers no recommendations.

Limitations

This asbestos survey report was prepared based on information obtained during our on-site observations and interpretation of the laboratory analysis of bulk samples of building materials collected during the survey.

The conclusions of this report are professional opinions based solely upon our visual site observations and interpretations of laboratory analyses and field data as described in our report.

This report has been prepared to provide information concerning the various types and estimated quantities of asbestos-containing materials present at this site. It includes only those materials that were visible and accessible at the time of our inspection. We did not remove any permanent building enclosures or disassemble any equipment.

This report is intended to identify asbestos-containing materials. It is not intended to be used for the purpose of obtaining bids for its removal by abatement contractors. The scope of services provided by Northern may not be appropriate to satisfy the needs of other users, and any use or re-use of this document, or the findings presented herein, is at the sole risk of the user.

Our opinions are intended exclusively for use by the Montana Department of Transportation. The opinions presented herein apply to the site conditions existing at the time of our investigation. Therefore, our opinions and recommendations may not apply to future conditions that may exist at the site that we have not had the opportunity to evaluate.

We trust this summary report provides sufficient information for planning purposes. We appreciate the opportunity to assist you and look forward to continuing to work with you.

Please contact us if you have any questions or require additional information.

Respectfully submitted,

NORTHERN INDUSTRIAL HYGIENE, INC.

Greg Brownell
EPA/Montana Accredited Asbestos Inspector

Attachments: Laboratory Analysis Reports
Inspector Credentials
Invoice

EMSL Analytical, Inc.

3356 West Catalina Drive Phoenix, AZ 85017
Tel/Fax: (602) 276-4344 / (602) 276-4053
http://www.EMSL.com / phoenixlab@emsl.com

EMSL Order: 122100505
Customer ID: NIHI62
Customer PO:
Project ID:

Attention: Greg Brownell
Northern Industrial Hygiene, Inc.
201 South 30th Street
Billings, MT 59101

Phone: (406) 245-7766
Fax: (406) 254-1428
Received Date: 02/01/2021 9:45 AM
Analysis Date: 02/06/2021 - 02/08/2021
Collected Date:

Project: 999-4161 / Johnson Lane Interchange

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
M14.1A *122100505-0001*	Concrete	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
M14.1B *122100505-0002*	Concrete	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
M14.1C *122100505-0003*	Concrete	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
M14.2A *122100505-0004*	Asphalt	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
M14.2B *122100505-0005*	Asphalt	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
M14.2C *122100505-0006*	Asphalt	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
M20.1A *122100505-0007*	Expansion Joint Sealant (Tar)	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
M20.1B *122100505-0008*	Expansion Joint Sealant (Tar)	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
M20.1C *122100505-0009*	Expansion Joint Sealant (Tar)	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
M20.2A *122100505-0010*	Elastomeric Pad	Black Fibrous Homogeneous	5% Synthetic	95% Non-fibrous (Other)	None Detected
M20.2B *122100505-0011*	Elastomeric Pad	Black Fibrous Homogeneous	5% Synthetic	95% Non-fibrous (Other)	None Detected
M20.2C *122100505-0012*	Elastomeric Pad	Black Fibrous Homogeneous	5% Synthetic	95% Non-fibrous (Other)	None Detected
M20.3A *122100505-0013*	Silver Paint	Brown/Silver Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected
M20.3B *122100505-0014*	Silver Paint	Brown/Silver Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected
M20.3C *122100505-0015*	Silver Paint	Brown/Silver Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected

Initial report from: 02/08/2021 10:33:48

EMSL Analytical, Inc.
3356 West Catalina Drive Phoenix, AZ 85017
Tel/Fax: (602) 276-4344 / (602) 276-4053
http://www.EMSL.com / phoenixlab@emsl.com

EMSL Order:	122100505
Customer ID:	NIHI62
Customer PO:	
Project ID:	

Analyst(s)

Jillian Chesson (5)
Ky Nguyen (10)

Michelle Wilson

Michelle Wilson, Laboratory Manager
or Other Approved Signatory

Initial report from: 02/08/2021 10:33:48

OrderID: 122100505

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Bulk Building Material Chain of Custody

EMSL Order Number *(lab use only)*:

 # 122100505

EMSL Analytical, Inc.
3356 West Catalina Drive
Phoenix, AZ 85017
Phone (602) 276-4344
Fax (602) 276-4053

Company Name : Northern Industrial Hygiene		**EMSL Customer ID:**	
Street: 201 South 30th Street		**City:** Billings	**State or Province:** MT
Zip/Postal Code: 59101	**Country:** US	**Telephone #:** (406)245-7766	**Fax #:**
Report To (Name): Greg Brownell		**Please Provide Results via:** ☐ Fax ☒ Email	
email Address: gbrownell@northernih.com		**Purchase Order Number:**	
Client Project ID: 999-4161/Johnson Lane Interchange		**EMSL Project ID** *(internal use only)*:	
State or Province Collected: MT		**CT only** ☐ **Commercial/Taxable** ☐ **Residential/Tax Exempt**	

EMSL-Bill to: ☐ Same ☑ Different - *If bill to is different note instructions in comment. Third party billing requires written authorization from third party*

Turnaround Time (TAT) Options Please Check

☐ 3 Hour	☐ 6 Hour	☐ 24 Hour	☐ 32 Hour*	☐ 48 Hour	☐ 72 Hour	☐ 96 Hour	☒ 1 Week	☐ 2 Week

*32 Hour TAT available for select tests only; samples must be submitted by 11:30am.
Please call ahead for large projects and/or turnaround times 6 hours or less.

PLM - Bulk (reporting limit)	TEM – Bulk
■ PLM EPA 600/R-93/116 (<1%)	☐ TEM EPA NOB – EPA 600/R-93/116 Section 2.5.5.1
☐ PLM EPA NOB (<1%)	☐ NY ELAP Method 198.4 non-friable - NY
Point Count ☐ 400 (<0.25%) ☐ 1000 (<0.1%)	☐ Chatfield Protocol (semi-quantitative)
Point Count w/Gravimetric ☐ 400 (<0.25%) ☐ 1000 (<0.1%)	☐ TEM % by Mass – EPA 600/R-93/116 Section 2.5.5.2
☐ NIOSH 9002 (<1%)	☐ TEM Qualitative via Filtration Prep Technique
☐ NY ELAP Method 198.1- friable - NY	☐ TEM Qualitative via Drop Mount Prep Technique
☐ NY ELAP Method 198.6 NOB- non-friable - NY	**Other tests (please specify)**
☐ NY ELAP Method 198.8- Vermiculite Surfacing Material	
☐ OSHA ID-191 Modified	☐
☐ EMSL Standard Addition Method	

■ **Positive Stop – Clearly Identify Homogenous Areas (HA)** **Date Sampled:** 1/28/21

Sampler's Name: Greg Brownell **Sampler's Signature:** Greg Brownell

Sample #	HA #	Sample Location	Material Description
M14.1A		East End Eastbound Bridge	Concrete
M14.1B		West End Eastbound Bridge	〃
M14.1C		West End Westbound Bridge	〃
M14.2A		West End Eastbound Bridge	Asphalt
M14.2B		West End Westbound Bridge	〃
M14.2C		East End Westbound Bridge	〃

Client Sample # (s): M14.1A - M20.3C **Total # of Samples:** 15

Relinquished by (Client): Greg Brownell **Date:** 1/29/21 **Time:** 5:00pm

Received by (Lab): CS **Date:** 4/1/21 **Time:** 0945

Comments/Special Instructions:
BillTo: Tasha Neil, 201 South 30th Steet, Billings, MT, 59101, US
Attention: Tasha Neil Phone: (406)245-7766 Email: Tneil@northernih.com Purchase Order:

7960 5879 2084

Page 1 of 2

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Bulk Building Material Chain of Custody

EMSL Order Number *(lab use only)*:

#122100505

EMSL Analytical, Inc.
3356 West Catalina Drive

Phoenix, AZ 85017
Phone (602) 276-4344
Fax (602) 276-4053

Additional pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	HA #	Sample Location	Material Description
M20.1A		East End Eastbound Bridge	Expansion Joint Sealant (TAR)
M20.1B		West End Eastbound Bridge	〃
M20.1C		West End Westbound Bridge	〃
M20.2A		East End Eastbound Bridge	Elastomeric Pad
M20.2B		West End Eastbound Bridge	〃
M20.2C		West End Westbound Bridge	〃
M20.3A		East End Eastbound Bridge	Silver Paint
M20.3B		West End Eastbound Bridge	〃
M20.3C		West End Westbound Bridge	〃

***Comments/Special Instructions:**
BillTo: Tasha Neil, 201 South 30th Steet, Billings, MT, 59101, US
Attention: Tasha Neil Phone: (406)245-7766 Email: Tneil@northernih.com Purchase Order:

GREG BROWNELL

has met the requirements of Montana Administrative Rule 17.74.362 and/or 17.74.363 for accreditation in the following asbestos occupation(s) through the specified expiration date(s).

MTA-5502

Asbestos Inspector	04/10/2021
Project Contractor/Supervisor	01/14/2022

MT DEQ Asbestos Control Program