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Gorham Bypass Study : Air Quality and Noise Technical Report

Gorham Bypass Study

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Cumberland County, Maine

Air Quality and Noise Technical Report

Prepared For The
Environmental Assessment

Submitted Pursuant to 42 U.S.C. 4332 (2)(c),
23 U.S.C 138 and 23 CFR 771
by:

U.S. Department of Transportation
Federal Highway Administration

and

Maine Department of Transportation

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Standard Acronyms and Abbreviations

AADT – Annual Average Daily Traffic
AASHTO – American Association of State Highway and Transportation Officials
ac – acre
ACHP – Advisory Council on Historic Preservation
ACOE – United States Army Corps of Engineers
AFDC – Aid to Families with Dependent Children
ARAN – Automatic Road Analyzer
ATR – Automatic Traffic Recorder
ATV – All Terrain Vehicle
B/C – Benefit/Cost Ratio
BMP – Best Management Practice
BTIP – Biennial Transportation Improvement Program
CAAA – Clean Air Act Amendments of 1990
CAL3QHC – EPA's Modeling Methdology for Predicting Pollutant Concentrations near Roadway Intersections
CBER – Center for Business and Economic Research
CEQ – Council on Environmental Quality
CERCLIS – Comprehensive Environmental Response, Compensation and Liability Information System
CFR – Code of Federal Regulations
CO – Carbon monoxide
CRF – Critical Rate Factor
dBA – Loudness (sound pressure level) measured on a logarithmic scale in units of decibels (dB), using an A-weighted filter
DEIS – Draft Environmental Impact Statement
DHV – Design Hour Volume
E & T Plant List Maine Natural Area Program – Official List of Endangered and Threatened Plants in Maine
EA – Environmental Assessment
EFH – Essential Fish Habitat
EIS – Environmental Impact Statement
EPA –U.S. Environmental Protection Agency
FEIS – Final Environmental Impact Statement
FEMA – Federal Emergency Management Agency
FHWA – Federal Highway Administration
FIRM – Flood Insurance Rate Map
FONSI – Finding of No Significant Impact
FMVECP - Federal Motor Vehicle Emission Control Program
FPPA – Farmland Protection Policy Act
ft - feet
GIS – Geographic Information Systems
GRP – Gross Regional Product
GW-A – Groundwater A
ha - hectare
HCAMP – Habitat Consultation Areas Mapping Program
HCL – High Crash Location
km - kilometer
kph – kilometers per hour
LAWCON – Land and Water Conservation Fund
Leq – One-hour equivalent sound level
LMA – Labor Market Area
LOS – Level of Service

LURC – Maine Land Use Regulation Commission
m - meters
MASC – Maine Atlantic Salmon Commission
MBPL – Maine Bureau of Parks and Lands
MDEP – Maine Department of Environmental Protection
MDIF&W – Maine Department of Inland Fisheries and Wildlife
MDOC – Maine Department of Conservation
MDOT – Maine Department of Transportation
MDWP – Maine Drinking Water Program
ME-GAP – Maine Gap Analysis Program
MHPC – Maine Historic Preservation Commission
mi -miles
MNAP – Maine Natural Areas Program
MOA – Memorandum of Agreement
MOBILE5b – Mobile Source Emission Factor Model
mph – miles per hour
MPO – Metropolitan Planning Organization
M.R.S.A. – Maine Revised Statutes Annotated
MSA - Metropolitan Satisticical Area
MSPO – Maine State Planning Office
NAAQS – National Ambient Air Quality Standards
NAC – Noise Abatement Criteria
NEPA – National Environmental Policy Act
NFIP – National Flood Insurance Program
NHPA – National Historic Preservation Act
NHS – National Highway System
NMFS – National Marine Fisheries Service
NO – Nitric Oxide
NOx – Nitrogen Oxides
NO2 – Nitrogen Dioxide
NPL – National Priority List
NPS – Nonpoint source
NPS – National Park Service
NRCS – Natural Resources Conservation Service
NRHP – National Register of Historic Places
NRIMC – Natural Resource and Information Mapping Center
NRPA – Maine Natural Resources Protection Act
NWI – National Wetlands Inventory
OD – Origin-Destination
OGIS – Maine Office of Geographic Information Systems
ORS – Outstanding River Segment
PAC – Public Advisory Committee
PEM – Palustrine Emergent Wetland
PFO – Palustrine Forested Wetland
PIN – Project Identification Number
PLT -- Plantation
ppm – parts per million
PSS – Palustrine Scrub-Shrub Wetland
PUB – Palustrine Unconsolidated Bottom
RCRA – Resource Conservation and Recovery Act
REMI – Regional Economic Models, Inc. of Amherst, MA
ROD – Record Of Decision
RTAC – Regional Transportation Advisory Committee
S.A.D. – School Administrative District

SCS – Soil Conservation Service (now the NRCS)
SHPO – State Historic Preservation Officer
SIP – State Implementation Plan
SSA – Sole Source Aquifer
STPA – Maine's Sensible Transportation Policy Act
STIP – Statewide Transportation Improvement Program
SWPPP – Stormwater Pollution Prevention Plan
T15 R4 – Township 15 Range 4 (example, numbers used vary)
TCP – Traditional Cultural Property
TDM – Transportation Demand Management
TIP – Transportation Improvement Program
TNM – Traffic Noise Model
TSM – Transportation Systems Management
Twp – Township
USA – United States of America
U.S.C. – United States Code
USDA – United States Department of Agriculture
USFWS – United States Fish and Wildlife Service
USGS – United States Geological Survey
USDOT – United States Department of Transportation
v/c – volume/capacity ratio
VOCs – Volatile Organic Compounds
vpd – vehicles per day
VHT – Vehicle-Hours Traveled
VMT – Vehicle-Miles Traveled
WELS – West of the easterly line of the state (this term is part of naming the unorganized townships of the State)
WPA – Wellhead Protection Area

Standard Terms

85th Percentile Speed – The 85th-percentile speed is the speed at which eighty-five (85) percent of the vehicles on a given highway travel at or below. The most common application of the value is its use as one of the factors for determining the posted, legal speed limit of a highway section. In most cases, the field measurements for the 85th-percentile speed will be conducted during off-peak hours.

100-Year Floodplain – The portion of the floodplain submerged by the statistical flood event with a 1 percent probability of occurring in any year.

Activity center – Activity centers are generally defined as areas that generate economic activity or areas that support a major industry. Houlton, Presque Isle, Caribou and Madawaska are the largest economic activity centers in Aroostook County and are important regional transportation resources. Industrial parks and major trucking generators in Mars Hill, Easton, Ashland, Limestone, Fort Fairfield, Fort Kent, and Van Buren are other important activity centers within Aroostook County.

Additional Farmland Soils of Statewide Importance – Soils that are nearly Prime Farmland and that produce high yields of crops when treated and managed according to acceptable farming methods (see definition of "Prime Farmlands" below).

Advisory Council on Historic Preservation (ACHP) – The major policy advisor to the Federal government in the field of historic preservation. The 20 members of the Council are appointed by the President and include the Secretary of Agriculture, the Secretary of the Interior, the Architect of the Capitol, the chairman of the National Trust for Historic Preservation, and the president of the National Conference of State Historic Preservation Officers.

Alkaline – With a pH value greater than 7: generally applied to soils and surface water.

Alkalinity - A measure of the capacity of water to neutralize acid. Alkalinity is primarily a function of bicarbonate, carbonate, and hydroxide ions and is typically expressed in parts per million (ppm) of calcium or magnesium ions.

Annual Average Daily Traffic (AADT) – The total yearly traffic volume on a given highway segment divided by the number of days in the year. AADT is expressed in vehicles per day (vpd).

Aquifer – Rock or sediment that is saturated with water and sufficiently permeable to transmit economically significant quantities of water to wells and springs.

Archaeological resources – Materials and objects that remain below the ground surface as evidence of the life and culture of historic, prehistoric, or ancient people, such as artifacts, structures, or settlements. Resources of concern are located in areas known or suspected to contain subsurface artifacts of pre-european or post-european settlement populations. Areas of expected moderate to high archaeological sensitivity according to various factors including present and past topography, exposure, slope, distance to water, and availability of food.

Archaeologically Sensitive Shorelines – Shores of waterbodies determined by the Maine Historic Preservation Commission (MHPC) to be likely to yield prehistoric artifacts, based on a predictive model using topography, hydrology, and surficial soil types to assess sensitivity.

Archaeologically Sensitive Surficial Deposits – Land forms that are likely locations of prehistoric settlements or gathering places, based on a MHPC predictive model that uses surficial geology (waterbodies, alluvium, lake bottom deposits, glacial outwash, and eskers) to assess sensitivity.

Army Corps of Engineers (ACOE) – A federal agency that administers Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act; its regulatory programs address wetlands and waterways protection.

Arterials – Roads with high traffic volumes that provide linkage between major cities and towns and developed areas, capable of attracting travel over long distances. Basically, they provide service to interstate and intercounty travel demand. The arterial system typically provides for high travel speeds and the longest trip movements. The degree of access control on an arterial may range from full control (freeways) to entrance control on, for example, an urban arterial through a densely developed commercial area.

At-grade –The intersection of two roads, or a road and a railway, that cross at the same elevation.

At-Risk Watershed – Watersheds contributing to waterbodies that are at risk of eutrophication due to new development and phosphorus-laden runoff. These waterbodies include public drinking water supplies and waters that currently exhibit algal blooms or other signs of eutrophication. At-risk watersheds are defined according to criteria in Maine's Stormwater Law (5 M.R.S.A. § 3331).

Attainment area – A geographic area in which levels of a criteria air pollutant meet the health-based primary standard (National Ambient Air Quality Standard) for the pollutant. Attainment areas are defined using federal pollutant limits set by the U.S. Environmental Protection Agency.

Avian – Refers to all things of, relating to, or derived from birds

Basaltic – A dark-colored extrusive igneous rock composed chiefly of calcium plagioclase and pyroxene that underlies the oceanic basins and comprises oceanic crust.

Best Management Practice (BMP) – A structural and/or management practice employed before, during and after construction to protect receiving water quality. These practices either provide techniques to reduce soil erosion or remove sediment and pollutants from surface runoff.

Biodiversity –The diversity of genes, species, and ecosystems. This term includes the entire hierarchy of ecological organization, and encompasses regional ecosystem diversity (landscape diversity), local ecosystem diversity (community diversity), species diversity, and genetic diversity within populations of a species.

Biophysical region – A relatively homogeneous area based on analysis of topography, climate, and species richness of vertebrates and plants.

Business incubator – A facility intended to provide space and resources for newly-formed businesses.

Calcareous pelite – A fine-grained sedimentary rock consisting mostly of clay and/or silt that has an abundance of calcium carbonate.

Cambrian – The first geologic time period of the Paleozoic Era. The Cambrian period spanned from approximately 590 to 505 million years ago.

Carbon monoxide (CO) – A colorless, odorless, tasteless gas formed in large part by incomplete combustion of fuel. Full combustion activities (i.e. transportation, industrial processes, space heating, etc.) are the major sources of CO.

Collector Roads – Roads characterized by a roughly even distribution of their access and mobility functions. These routes gather traffic from local roads and streets and deliver it to the arterial system. Traffic volumes and speeds will typically be lower than those of arterials.

Community Cohesion – The interactions among persons and groups in a community, including social relationships and patterns.

Community Supply – A public water system that is comprised of one or multiple wells or reservoirs that serves at least 25 residents throughout the year.

Conglomerate – A clastic sedimentary rock composed of lithified beds of rounded gravel mixed with sand.

Controlled-Access Highway – A highway that provides limited points of access and egress. Freeways, such as I-95, are controlled access highways in which access points occur only at interchanges. These highways serve mobility needs, and are designed to accommodate higher travel speeds.

Cost effectiveness – In the context of this study, cost effectiveness is an economic measure used to evaluate and compare the corridors in this study. Cost effectiveness is defined as the present value of the 2030 gross regional product (GRP) growth per dollar of construction cost. In this way, cost effectiveness compares the relative future economic benefits against the size of the investment required to generate those benefits.

Cumulative impacts – The impacts on the environment that result from the incremental impact of a project when added to other past, present, and reasonable foreseeable future actions regardless of what agency or person undertakes such other actions.

Daily traffic volume – The number of vehicles that use a given roadway over a 24-hour period in both directions.

dBA –An abbreviation for A-weighted decibel. The decibel is a unit used to describe sound pressure levels on a logarithmic scale. For community noise impact assessment, an A-weighted frequency filter is used to approximate the way humans hear sound.

Deciduous – Refers to woody vegetation, such as oak or maple trees, that shed their leaves after the growing season.

Deer Yard – Areas of softwood-dominated forest that provide food resources and shelter for deer during severe winter conditions.

Demand – Vehicular traffic demand (volume) on a given highway segment, expressed in vehicles per day (vpd).

Demand shift – The change in demand (volume) on a given highway segment, expressed in vehicles per day (vpd). Demand shifts can be caused by new corridors that provide a faster and/or shorter travel route.

Design Hourly Volume (DHV) – The hour used for geometric design of highways, typically the 30th highest traffic volume of the year.

Design speed – The maximum safe speed that can be maintained over a specified section of highway when conditions are so favorable that the design features of the highway govern. The design speed should equal or exceed the posted/regulatory speed limit of the facility.

Development node – An area that has experienced or is expected to experience development and a resulting growth in employment and/or population.

Devonian – The oldest period of the Upper Paleozoic Era, covering a time span between approximately 400 and 360 million years ago.

Disadvantaged Population – A group of people, living in one area, who have a median income below the federal poverty level, or who exhibit other indicators of economic disadvantage.

Dolostone – A carbonate rock made up predominantly of the mineral dolomite, $CaMg(CO_3)_2$.

Draft Environmental Impact Statement (DEIS) – The document prepared by the Federal Highway Administration (FHWA) in accordance with FHWA National Environmental Policy Act (NEPA) regulations (23 CFR Part 771). These regulations require that the EIS evaluate all reasonable alternatives considered, discuss the reasons that alternatives have been eliminated from detailed study, summarize the studies, reviews, consultations, and coordination required by environmental laws and Executive Orders.

Driver eye height – The height above the road of the eyes of vehicle drivers, a function of the seating height, and important in stopping sight distance considerations.

Ecoregion – An area defined by similar climate, topography, and biological communities.

Edge effect – The potential impacts to natural plant and animal communities that result from the creation of new edge habitat, which may include increased predation, decreased reproductive success, and changes in community composition.

Edge habitat – An area along a transitional zone between two or more vegetation cover types that provides feeding, breeding, nesting, or cover habitat for wildlife.

Endangered Species – Any species which is in danger of extinction throughout all or a significant portion of its range.

Environmental Assessment (EA) – The document prepared by the Federal Highway Administration (FHWA) in accordance with FHWA National Environmental Policy Act (NEPA) regulations (23 CFR Part 771). The EA provides sufficient evidence of analysis that determines whether to prepare an Environmental Impact Statement or a Finding of No Significant Impact. The environmental assessment includes documentation specified in 40 CFR parts 1500-1508, §1508.9 and §1508.13.

Environmental Justice – Executive Order 12898 requires each federal agency to "make achieving environmental justice part of its mission by identifying and addressing... disproportionately high and adverse human health or environmental impacts on minority populations and low-income populations."

Esker – An elevated linear or sinuate glacial landform resulting from deposition of glacial streambed gravels.

Essential Fish Habitat (EFH) – Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity, as defined by the regional Fishery Management Council.

Eutrophication – Change in the biological and physical characteristics of a body of water due to increased nutrient input that result in increased productivity. Eutrophication may occur naturally or through man-induced changes in nutrient inputs.

Farmland Protection Policy Act (FPPA) – A statute enacted in 1981 by the United States Congress to ensure that significant agricultural lands be protected from conversion to non-agricultural uses. For highway projects receiving federal aid, the regulations promulgated under the FPPA (7 CFR Part 658, 1984) require a state highway authority (MDOT) to coordinate with the USDA Natural Resources Conservation Service. The FPPA regulates four types of farmland soils; prime farmland, unique farmland, farmland of state-wide importance, and farmland of local importance.

Farmland Soils – Soils suited to producing crops; those with soil quality, growing season and moisture supply needed to produce a sustainable yield when treated and managed using acceptable methods. Specifically, farmland soils are those soil types designated by the Natural Resources Conservation Service (NRCS) in accordance with the Farmland Protection Policy Act (FPPA) of 1981 by the United States Department of Agriculture (USDA).

Federal Emergency Management Agency (FEMA) – A federal agency that regulates federal actions in floodplains.

Federal Highway Administration (FHWA) – The branch of the U.S. Department of Transportation responsible for administering the funding of federal-aid highway projects.

Federal-Aid System – The federal-aid system consists of those routes within Maine that are eligible for the categorical federal highway funds.

Felsic – A generally light-colored igneous rock with significant amounts of silica, oxygen, aluminum, and potassium.

Final Environmental Impact Statement (FEIS) – The document prepared after circulation of a draft EIS and consideration of comments received. FHWA NEPA regulations (23 CFR Part 771.125) require that the FEIS identify a preferred alternative, evaluate all reasonable alternatives considered, discuss and respond to substantive comments on the EIS, summarize public involvement, and describe the mitigation measures that will be incorporated into the proposed action.

Floodplain – The level area adjoining a river channel inundated during periods of high flow.

Floodway – The channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order that the 100-year flood is carried without substantial increases in flood heights.

Forest block – Units of forest uninterrupted by roadways or other disturbance.

Fragmentation – Subdivision of a forest or other habitat into isolated patches by roads, land clearing, or other human or natural alterations of the landscape, accompanied by the loss of a certain portion of the original habitat.

Freeways – The freeway (or interstate) is the highest level of arterial. Full control of access, high design speeds and a high level of driver comfort and safety characterize these highways.

Functional Conflict – Highways provide a balance between providing access (with multiple access points) and mobility (with limited access points). Freeways are designed to maximize mobility and serve regional traffic demands as opposed to local roads (or collectors) that provide multiple access points to adjacent land uses (residences or businesses). Functional conflicts arise when regional traffic that would be better served on a Freeway uses local roads.

Geographic Information System (GIS) – A computer-based application used to perform spatial analysis.

Geometric deficiency - A deficiency that occurs when a highway's geometric characteristics (lane width, shoulder width, horizontal curvature, vertical grade, etc.) do not meet prevailing design standards.

Glacial outwash – Surficial sand and gravel sediments deposited ahead of a glacier by glacial meltwater.

Glacial till – Compact surficial sediments consisting of poorly sorted, mixed minerals and rocks, deposited by melting glaciers.

Grade – The slope of a road along the direction of travel, normally characterized by the vertical rise per unit of longitudinal distance.

Grade separation – The intersection of two roads, or a road and a railway, that cross at different elevations. One roadway overpasses or underpasses the other roadway with a structure(s).

Gross Regional Product (GRP) – Gross Regional Product is one of the major economic indices of the socio-economic development of a region. GRP is equal to the total of added values in the regional economic industries, estimated as a difference between production and intermediate consumption.

Groundwater Recharge Protection Areas – Areas of land designated by water resource agencies that rainwater or snowmelt percolates and replenish the underlying aquifer in the area of a public well. These areas require special protection because they directly affect the quality and safety of the public drinking water supply.

GW-A – The highest groundwater classification in Maine. GW-A is applied to water suitable for direct human consumption without treatment.

Habitat Consultation Areas Mapping Program (HCAMP) – A cooperative program of the MDIF&W and MNAP to provide mapping showing the areas of state-listed endangered and threatened animals and plants.

Herpetofauna – Refers to reptile and amphibian species.

High Crash Location (HCL) – A High Crash Location is an intersection or highway segment that experiences an abnormally high number of accidents relative to the traffic demands that are served. For the State of Maine, the Maine Department of Transportation identifies HCLs.

Highway Reconstruction/Rehabilitation – Reconstruction of an existing highway is undertaken when the pavement structure or alignment of the existing facility is deficient. Reconstruction includes removal and replacement of the entire pavement structure, significant changes in the vertical or horizontal alignment, or addition of lanes. Rehabilitation includes resurfacing and other minor repairs intended to extend the service life of the existing facility and enhance highway safety.

Historic resources – Properties, structures and districts that are listed in or have been determined to be eligible for listing in the National Register of Historic Places.

Hourly traffic volume – The number of vehicles that use a given road over a 1-hour period.

Hydric soils – Soils that are saturated, flooded, or ponded long enough during the growing season to develop at least temporary conditions where there is no free oxygen in the soil around the roots. Hydric soils correspond to federally and state regulated wetlands in many circumstances.

Hydrologic regime – The frequency and duration of inundation or soil saturation of a given area.

Impacted Receiver – A condition that exists if sound levels approach or exceed the Noise Abatement Criteria (NAC) or a 15-decibel (dBA) increase in ambient noise levels.

Impervious surface – Relating to hydrology. A surface through which precipitation cannot penetrate, causing direct runoff or perching (examples include asphalt paving roofs, and densely compacted gravel).

Interstate – A freeway-type highway that is part of the National Highway System.

Interstate Highway System – The network of Interstate Highways established by the Federal-Aid Highway Act of 1956. The statute established a 41,000-mile network of controlled-access highways (expanded to 42,000 miles by legislation in 1968) intended to connect all metropolitan areas with populations greater than 50,000 and all state capitals.

Just-In-Time Delivery – Commercial deliveries that arrive immediately prior to their use. Just-in-time deliveries help producers minimize storage or warehousing space.

Kettle – A depressional glacial landform resulting from a melting block of ice embedded in till.

Labor Market Area (LMA) – Labor market areas are regional areas with a high concentration of employment opportunities. These are economically integrated units within which workers may readily change jobs without changing their place of residence.

Lacustrine – Of and related to lakes.

Land and Water Conservation Fund – A system for funding Federal, State and local parks and conservation areas, created by the Land and Water Conservation Fund Act of 1964.

Limited-Access facility – A highway where access to abutting properties is restricted or limited by control of the right-of-way.

Link – A new or existing highway segment between two defined end-points.

Lithic sandstone (graywacke) – A variety of sandstones characterized by angular-shaped grains of quartz and feldspar and small fragments of dark rock set in a matrix of finer particles.

Local Roads and Streets – All public roads and streets not classified as arterials or collectors will have a local classification. Local roads and streets are characterized by many points of direct access to adjacent properties and have relatively minor role in accommodating mobility. Speeds and traffic volumes are usually low.

Mafic – A generally dark-colored igneous rock with significant amounts of one or more ferromagnesian minerals, or formed from a magma with significant amounts of iron and magnesium.

Magnuson-Stevens Fishery Conservation and Management Act – Legislation (16 U.S.C. 1855(b)) governing all fisheries resources within 320 kilometers (200 miles) of the U.S. coast that established regional Fishery Management Councils and required the preparation of Fisheries Management Plans.

Maine Highway Design Guide – A tool developed by the Maine Department of Transportation that provides guidance for the design of roads and highways in the State of Maine in addition to the Federal Highway Administration design criteria.

Maine Land Use Regulation Commission (LURC) – Title 12, M.R.S.A, Chapter 206 –A Commission established by Title 12, M.R.S.A., Chapter 206 to administer the Land Use Regulation Law (12 M.R.S.A. § 681) by preparing land use standards prescribing standards for the use of air, lands and waters within the plantations and unorganized townships of Maine.

Maine's Sensible Transportation Policy Act (STPA) – Maine's Sensible Transportation Policy Act is a state law enacted in 1991 by the citizens of Maine that provides a decision making framework for examining a range of alternatives. The STPA is applicable to transportation planning decisions, capital investment decisions, and project selection decisions made by the Maine Department of Transportation (MDOT).

Maine State Design Standards – State adopted (February 1997) travelway and shoulder design width criteria for non-National Highway System facilities.

Major Collector Road – Collector Roads that tend to serve higher traffic volumes than other Collector Roads. Major collector roads typically link arterials. Traffic volumes and speeds will typically be lower than those of Principal Arterials.

Mesoscale air quality analysis – A regional-level analysis of air for chemical constituents

Metamorphosed – With respect to rock, a rock formation that has been altered by the action of heat and pressure.

Microscale air quality analysis – An analysis of air for chemical constituents, typically conducted for a small study area such as an intersection.

Mill Rate – The property tax rate, per $1,000 of assessed value.

Minor Arterial – Minor arterials are highways that tend to link Collector Roads to Principal Arterials and serve lower traffic volumes than typical arterials. Minor Arterials are also typically designed at lower travel speeds than Principal Arterials.

Mitigation – Actions that avoid, minimize, or compensate for potential adverse impacts.

Multi-modal service – The act of providing alternative modes or choices of transportation service, such as bus, rail, taxi, etc.

National Ambient Air Quality Standards (NAAQS) – The prescribed level of pollutants in the outside air that cannot be exceeded during a specified time in a specified geographic area.

National Environmental Policy Act of 1969, as amended (NEPA) – The federal legislation that requires an interdisciplinary approach in planning and decision-making for federal-aid actions. The Act includes requirements for the contents of environmental impact statements that are to accompany every recommendation for major federal actions significantly affecting the quality of the human environment. The interdisciplinary study approach includes the analysis of potential impacts to the natural, social and economic environment.

National Highway System (NHS) – The National Highway System is a system of those highways determined to have the greatest national importance to transportation, commerce and defense in the United States. It consists of the Interstate highway system, logical additions to the Interstate system, selected other principal arterials, and other facilities that meet the requirements of one of the subsystems within the NHS.

National Historic District – An area, comprising numerous buildings and their setting, identified as historic in the National Register of Historic Places.

National Priority List (NPL) – The "Superfund" statute (42 U.S.C. Sect. 9601) requires the EPA to establish a National Priorities List of sites which are to be given top priority consideration for removal of hazardous substances and remedial action.

National Register of Historic Places – A list of structures, sites and districts of national historical significance as determined by the Advisory Council on Historic Preservation under the National Historic Preservation Act.

National Wetlands Inventory (NWI) – A program administered by the U.S. Fish and Wildlife Service for mapping and classifying wetland resources in the United States.

Natural Resources Conservation Service (NRCS) – Formerly the Soil Conservation Service, NRCS is a department within the United State Department of Agriculture that is responsible for administering the Farmland Protection Policy Act.

New Location Highway – A highway proposed to be constructed on land not currently used for transportation facilities.

Nitrogen Oxides (NOx) – Nitric oxide (NO) and Nitrogen dioxide (NO2) are collectively referred to as oxides of nitrogen (NOx). NO forms during high temperature combustion process. NO2 forms when NO further reacts in the atmosphere. NOx reacts with the sunlight to form ozone, a colorless gas associated with smog or haze conditions. Ozone is a pollutant regulated by the Clean Air Act Amendments of 1990.

Noise abatement criteria (NAC) – Noise levels measured in decibels that are used as a basis of comparison for evaluating the impact from predicted design year noise and for determining whether noise abatement measures should be considered.

Noise abatement measures – Actions that reduce traffic noise impacts. Noise abatement measures can be traffic management measures, alteration of horizontal and vertical alignments, acquisition of property rights for construction of noise barrier, construction of noise barriers, acquisition of real property or interest for buffer zones, or noise insulation of public use or nonprofit institutional structures.

Noise receptor – Locations that may be affected by noise: sensitive receptors include residences, parks, schools, churches, libraries, hotels, and other public buildings.

Non-Community Supply – A public water system that serves at least 25 persons at least 60 days out of the year and is not a community or a seasonal water system.

Non-Point Source pollution (NPS) – Pollution of waterbodies that does not originate at a single specific source such as an industrial discharge or discharge from a wastewater treatment plant. Sources of non-point pollution include runoff from highways, agricultural fields, golf courses, and lawns.

Other Principal Arterial – Highways that provide access between arterials and a major port, airport, public transportation facility or other Intermodal transportation facility. Other Principal Arterials tend to serve lower traffic demands than Principal Arterials.

Outstanding River Segment (ORS) – A section of a river or stream designated by the Maine Natural Resources Protection Act (12 M.R.S.A. § 403) for protection because of the special resource values of its flowing waters and shorelines.

Ozone – A gas which is a variety of oxygen. Ozone is a pollutant regulated by the Clean Air Act Amendments of 1990. Ground-level ozone is the main component of smog. Ozone is not directly emitted by motor vehicles, but is formed when oxides of nitrogen react with sunlight.

Palustrine – The group of vegetated wetlands traditionally called by such names as marsh, swamp, bog, fen, and prairie. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes.

Palustrine Forested Wetland (PFO) – A palustrine wetland dominated by trees, commonly referred to as a swamp.

Palustrine Emergent Wetland (PEM) – A palustrine wetland dominated by herbaceous species, typically cattails, sedges and grasses, commonly referred to as a marsh.

Palustrine Scrub-Shrub Wetland (PSS) – A palustrine wetland dominated by shrubs.

Passing Sight Distance – The distance a passing vehicle on a two lane road will travel during a passing movement, plus an equal distance that an oncoming vehicle will travel during that time, plus a clearance distance or safety factor.

Peak hour – The hour of the day when traffic volume on a given roadway is highest. A separate peak hour can be defined for morning and evening periods.

Peak hour volume – The traffic volume that occurs during the peak hour, expressed in vehicles per hour (vph). Peak hour volumes are typically 10 to 15 percent of daily volumes.

Peak Hour Leq – Represents the noisiest hour of the day/night and usually occurs during peak periods of motor vehicle traffic. The Leq is the equivalent sound level measurement, which means it averages background sound levels with short-term transient sound levels and provides a uniform method for comparing sound levels that vary over time.

Posted speed limit – The speed posted for a facility based on engineering and traffic investigation.

Prehnite – A silicate mineral that forms in the cavities of basaltic rocks, low temperature hydrothermal fissures, and in limestone.

Primary/direct impacts – The immediate effects on the social, economic, and physical environment caused by the construction and operation of a highway; these impacts are usually experienced within the right-of-way or in the immediate vicinity of the highway or other element of the proposed action.

Prime Farmland Soil – Soil map units that are designated by the Natural Resources Conservation Service as having the properties needed to produce sustained high yield crops when managed with modern farming techniques.

Principal Arterials – Highways in rural and urban areas that connect urban areas, international border crossings, major ports, airports, public transportation facilities or other Intermodal transportation facilities.

Pumpellyite – A silicate mineral, closely related to epidote that forms in pelitic and dolomite rocks.

Rare and Exemplary Natural Community – An assemblage of interacting plants and animals and their common environment, recurring across the landscape, in which the effects of recent human interference are minimal. Rare natural communities are those which occur infrequently. Exemplary natural communities are exceptional representatives of more common natural communities.

RCRA Generator – An entity that produces hazardous waste regulated under the Resource Conservation and Recovery Act (RCRA) (42 U.S.C. sect. 6901), which mandates the appropriate identification, tracking, and disposal of hazardous waste.

Record of Decision (ROD) – The document, prepared by the Federal Highway Administration, that presents the basis for the Federal agency action, summarizes any mitigation measures to be incorporated, and documents any required Section 4(f) approvals. No Federal agency action may be undertaken until a Record of Decision has been signed. A Record of Decision is prepared no sooner than 30 days after the public release of the FEIS.

Relocations – The displacement of a residence, business or other structure from a property owner, for public use, that requires the residents or business to be moved to an alternate location.

REMI Model – The REMI Model (Regional Economic Models Inc.) is a widely used and accepted econometric model maintained and updated by the Center for Business and Economic Research at the University of Southern Maine.

Riparian – An area of land that encompasses and is contiguous to a stream or other water body.

Riverine – Of and relating to rivers.

Safety deficiency – In the context of this study, a safety deficiency is a highway segment or intersection that contains a high crash location (HCL).

Secondary impacts – Impacts that are caused by the proposed action and are later in time or farther removed in distance, but are still reasonably foreseeable; secondary impacts may include induced changes to land use patterns, population density or growth rate, and related effects on natural systems, including ecosystems.

Section 10 of the Rivers and Harbors Act of 1899 (Section 10) – Legislation (33 U.S.C. Section 403) that resulted in a permit being required from the Army Corps of Engineers for projects requiring construction in or over navigable waters, the excavation from or dredging or disposal of materials in such waters, or any obstruction or alteration in a navigable water (e.g. stream channelization).

Section 106 of the Historic Preservation Act (Section 106) – The National Historic Preservation Act of 1966 (16 U.S.C. 470f), Section 106, requires Federal agencies to take into account the effect of their undertakings on properties included in or eligible for inclusion in the National Register of Historic Places and to afford the Advisory Council on Historic Preservation the opportunity to comment on such undertakings.

Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C., Section 303) (Section 4(f)) – Legislation protecting publicly owned parks, public recreation areas, historic properties or wildlife and waterfowl refuges. The statute states that no Department of Transportation project may use land from these areas unless there is demonstrated to be no prudent and feasible alternative to using the land, and the project includes all possible planning to minimize harm resulting from the use.

Section 404 of the Clean Water Act (Section 404) – The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 401 et seq.) is the enabling legislation for protection of waters of the United States by the Army Corps of Engineers and the U.S. Environmental Protection Agency.

Section 6(f) of the Land and Water Conservation Funds Act (Section 6(f)) – Legislation that provides for the public purchase and preservation of tracts of land.

Sight distance – The distance that a driver can see along the roadway before curvature or obstructions block the view.

Significant Sand and Gravel Aquifer – A porous formation of ice-contact and glacial outwash sand and gravel that contains significant removable quantities of water which is likely to provide drinking water supplies.

Significant Wildlife Habitat – Wildlife habitats, including deer wintering yards, waterfowl and wading bird habitat, seabird nesting habitat, and significant vernal pools, that are protected under 38 M.R.S.A. § 480-B.

Silurian – The third geologic time period of the Paleozoic. The Silurian period lasted from approximately 438 to 408 million years ago.

Sole Source Aquifer (SSA) – An aquifer designated by EPA as the "sole or principal source" of drinking water for a given aquifer service area; that is, an aquifer that is needed to supply 50% or more of the drinking water for that area and for which there are no reasonably available alternative sources should the aquifer become contaminated.

State Implementation Plan (SIP) – A plan created under The 1990 Clean Air Act Amendments (CAAA) that establishes emission reduction requirements for ozone and carbon monoxide non-attainment areas. Proposed projects must demonstrate that the impacts of their emissions are consistent with the appropriate SIP.

Stormwater Pollution Preservation Plan (SWPPP) – A plan required for major construction projects under the EPA's National Pollutant Discharge and Elimination System (NPDES) general permit for construction activities. The SWPPP is required to address measures to prevent erosion, sedimentation, and other potential discharges of pollutants to water bodies and wetlands.

Stormwater runoff – The portion of precipitation that flows toward stream channels, lakes, or other waterbodies as surface flow.

Surface Water Supply Watershed – The watershed that contributes to a public drinking water supply.

System compatibility – System compatibility describes how well alternatives, either new highways or upgrades, fit into the existing highway network and the planned transportation improvement plan.

System continuity – System continuity is defined by how often the existing highways transition between wide, higher speed segments to narrow, low speed segments.

Threatened Species – Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Traditional Cultural Property (TCP) – A property or site that is eligible for inclusion in the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that are rooted in that community's history and are important to maintaining the continuing cultural identity of the community.

Traffic generator – Any business, government office, or place of employment or destination that generates or attracts traffic.

Transportation deficiencies – A highway related facility that is unable to safely and efficiently satisfy travel demands because of the intensity of traffic volumes, capacity, and/or safety.

Transportation Demand Management (TDM) – A system of actions whose purpose is to alleviate traffic problems through improved management of vehicle trip demand as opposed to adding new highway segments.

Transportation Improvement Program (TIP) – A staged multiyear program of transportation projects funded by the Federal Highway Administration and Federal Transit Administration.

Transportation Systems Management (TSM) – Relatively low cost measures to increase capacity and/or provide safety improvements on the existing transportation system. These measures typically include traffic signal timing or phasing adjustments, designation of turning lanes at specific intersection or driveways, access management improvements, and enhanced signage or markings.

United States Department of Agriculture (USDA) – A federal agency responsible for administering programs that address farming issues

United States Environmental Protection Agency (EPA) – A federal agency responsible for administering programs that address environmental issues.

United States Fish and Wildlife Service (USFWS) – A federal agency responsible for addressing the protection of fish and wildlife including rare, threatened, or endangered species. The USFWS plays an advisory role in the Section 404 regulatory program administered by the U.S. Army Corps of Engineers.

Upgrade – A geometric improvement to an existing highway segment.

Upper Devonian – The Devonian Period, which lasted from approximately 408 to 360 million years ago, contains three epochs. The Upper Devonian Epoch lasted from approximately 365 to 360 million years ago.

Vegetation cover type – A biological community characterized by certain vegetation characteristics, such as hardwood forest, mixed forest, shrub, herbaceous, and urban or residential managed vegetation.

Vehicle-Hours Traveled (VHT) – VHT is a measure of automobile use and trip time. One vehicle traveling one hour constitutes one vehicle-hour.

Vehicle-Miles Traveled (VMT) – VMT is a measure of automobile use and trip length. One vehicle traveling one mile constitutes one vehicle-mile.

Vernal pool – A temporary pool of surface water that provides breeding habitat for certain amphibian and invertebrate species.

Volatile Organic Compounds (VOCs) – Colorless gaseous compounds originating, in part, from the evaporation and incomplete combustion of fuels. In the presence of sunlight VOCs react to form ozone, a pollutant regulated by the Clean Air Act Amendments.

Waterfowl and Wading Bird Habitat – Wetlands that provide habitat for waterfowl (geese, brant, ducks) and wading birds (heron, egrets, bittern, rails), and that meet certain criteria for size, quality, and percent open water as established by Department of Inland Fish & Wildlife regulations.

Watershed – A region or area that contains all land ultimately draining to a water course, body of water, or aquifer.

Wellhead Protection Area (WPA) – Areas of land where human activities are regulated to protect the quality of ground water that supplies public drinking water wells.

Wetland – Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wild and Scenic River – A river or river segment, designated by the National Park Service, because of the outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values (16 U.S.C. 1271-1287).

1. Introduction

1.1 Air Quality

The air quality assessment for the Gorham Bypass Study was performed based on U.S. Environmental Protection Agency (EPA) and Federal Highway Administration (FHWA) procedures, and guidance from Maine Department of Environmental Protection (MDEP) and Maine Department of Transportation (MDOT). The air quality assessment consisted of a qualitative assessment of the air quality issues in the Study Area and was prepared in accordance with FHWA Technical Advisory T6640.8A, Chapter V, Section G.8(b).

1.2 Noise

A detailed noise analysis was performed to determine the impact of the proposed Gorham Bypass on residences and businesses along the bypass Alternatives 1c, 1e, 6b, 6c and 6d as well as in Gorham Village and along the existing roads leading into Gorham Village. This noise analysis was performed in accordance with the Federal Highway Administration's (FHWA) Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 CFR 772, Washington, D.C.,1982) and the Maine Department of Transportation's (MDOT) Highway Traffic Noise Policy. The FHWA's Traffic Noise Model (TNM) was used to predict traffic noise levels for this study. This analysis included the No-Build, Upgrade, and five Build Bypass Alternatives.

The study included noise measurements taken at eight residential receptors located in the vicinity of existing highways and the Gorham Bypass alternative alignments. The measurements were used to quantify the existing ambient noise conditions and to calibrate the traffic noise model.

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2. Inventory of Existing Conditions

2.1 Air Quality

Cumberland County in Maine, which includes the Study Area, is currently classified by Environmental Protection Agency (EPA) as in attainment (compliance) for all criteria pollutants except ozone. The region is currently classified as a Moderate Nonattainment Area for ozone, pursuant to the Clean Air Act Amendments of 1990 (CAAA).

In order to determine compliance with the National Ambient Air Quality Standards (NAAQS), long-term air quality monitoring is conducted by the Maine Department of Environmental Protection, Bureau of Air Quality Control. The MDEP operates several continuous monitoring sites in Maine that measure ambient concentrations of criteria pollutants.

The nearest MDEP-operated ozone monitoring station to the Study Area is located approximately 14 kilometers (8.8 miles) south/southwest of the Study Area in South Hollis, York County, ME (Site No. 230310038-1) (USEPA, 2001). There were no exceedances of the State and Federal 1-hour ozone standard of 0.12 parts per million (ppm) at this station during 2000 (the most recent complete year for which data are available). The maximum measured hourly ozone concentration in 2000 was 0.085 ppm. This value is below the NAAQS of 0.12 ppm. Despite the fact that there were no violations of the ozone standard recorded in 2000, the region in which the Study Area is located is designated as an ozone nonattainment area due to violations of the ozone standard that occurred in the recent past, 1997 and 1998.

The nearest MDEP-operated nitrogen dioxide (NO_2) monitoring station to the Study Area is located 70.7 kilometers (44.2 miles) west/southwest of the Study Area in Kittery, York County, ME (Site No. 230313002-1). There were no exceedances of the State and Federal annual NO_2 standard of 0.53 ppm at this station during 2000 (the most recent complete year for which data are available). The maximum measured annual concentration in 2000 was 0.010 ppm. This value is below the NAAQS of 0.053 ppm.

The region in which the Study Area is located is currently in attainment for carbon monoxide (CO). In 2000, there were no MDEP-operated monitoring stations in the vicinity of the Study Area that can be used to represent existing CO levels in the Study Area. However, ambient CO concentrations in the Study Area are expected to be typical (i.e., well below ambient NAAQS standards) of rural highway corridors and in compliance with the CO NAAQS of 35 ppm 1-hour concentrations.

2.2 Noise

2.2.1 Noise Measurements

A noise monitoring program was conducted on December 6-8, 2000, at a time when there was no snow on the ground in the Study Area, to measure existing Leq (equivalent noise level) noise levels in the Gorham Bypass Study Area. The Leq is the steady A-weighted sound level over any specified time period that has the same acoustic energy as the fluctuating noise during that period. Eight measurement locations (see Figure 2-1,

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page 2-2) were selected to be representative of receptors that would be most affected by the proposed alternatives and changes in traffic patterns on nearby roads. Short-term 20-minute measurements were obtained at these eight locations to characterize existing noise levels. The noise levels were measured using a CEL Model 593 sound level analyzer, and a Larson-Davis 820 sound level meter. Both meters were calibrated at the beginning and end of each measurement period with a Bruel and Kjaer Type 4231 calibrator.

Noise measurements were obtained at five locations near major roads and three ambient locations in residential areas. The major existing noise sources in these areas are traffic on major roads, and occasional vehicle passbys on local secondary streets. The measurement locations near major roads were at the property line of the following receptor locations: 2 Crestwood Drive (at Route 114); 69 State Street (Route 25); 159 Gray Road (Routes 4 and 202); Mosher Farm on Mosher Street (Route 237); and, at 21 Main Street (Route 25). The ambient residential locations were at 20 Adeline Drive, 80 Waterhouse Road, and 11 Meadow Crossing Road. Noise measurements were obtained during the morning and evening peak-hour periods (AM-PK and PM-PK, respectively) at Receptors 1 through 5, which are adjacent to major roads and are affected by existing traffic. At receptor locations 6, 7, and 8, ambient (or non-traffic dominated) background noise measurements were obtained during the off-peak hour periods (OFF-PK). Concurrent traffic counts were obtained at measurement locations 1 through 5 for use in the Traffic Noise Model (TNM) calibration. The measured noise levels are summarized in Table 2-1. The measured peak-hour equivalent noise levels (Leq) ranged from 64 to 77 A-weighted decibels (dBA). The highest measured Leq level of 77 dBA was obtained at the property line of the residence at 69 State Street on Route 25. Measured noise levels at the property lines of receptors 2 and 5 already exceed the FHWA impact criteria, while receptors 3 and 4 are at or approach the noise impact criteria level. These receptors are denoted by an asterisk (*) in Table 2-1. The measured off-peak ambient Leq levels ranged from 36 dBA at 20 Adeline Drive to 43 dBA at 11 Meadow Crossing. These measured ambient noise levels are typical of quiet rural residential areas.

Table 2-1: Noise Measurement Results: Existing Conditions

Receptor		Measurement		Hourly Leq Level (dBA)	FHWA Noise Abatement Criteria
No.	Description	Date	Period		
1	Residence, 2 Crestwood Drive (at Route 114)	12/5/00	AM-PK	65	67
		12/4/00	PM-PK	65	67
2	Residence, 69 State Street (Rte. 25)	12/5/00	AM-PK	76*	67
		12/4/00	PM-PK	77*	67
3	Residence, 159 Gray Road (Rtes. 4 & 202)	12/6/00	AM-PK	66*	67
		12/5/00	PM-PK	64	67
4	Residence, Mosher Farm, Mosher Street (Rte. 237)	12/6/00	AM-PK	65	67
		12/5/00	PM-PK	67*	67
5	Residence, 21 Main Street (Rte. 25)	12/6/00	AM-PK	68*	67
		12/5/00	PM-PK	67*	67
6	Residence, 20 Adeline Drive (Ambient Site)	12/4/00	OFF-PK	36	67
7	Residence, 80 Waterhouse Road (Ambient Site)	12/5/00	OFF-PK	42	67
8	Residence, 11 Meadow Crossing (Ambient Site)	12/5/00	OFF-PK	43	67

2.2.2 Noise Model Calibration

A comparison of the measured and predicted Leq noise levels at receptor locations 1 through 5 is shown in Table 2-2. Receptors 6, 7, and 8 were located in quiet neighborhoods with no significant nearby traffic. As a result, a noise modeling calibration was not performed at these locations. Using the concurrent traffic volume counts obtained during the noise measurements, the TNM noise model was used to predict existing traffic noise levels as part of the model calibration. All receptor locations, road geometries, ground conditions, and receptor elevations were based on the most recent study drawings. The AM and PM peak hour traffic conditions were modeled, as recorded in the field for existing conditions. Good agreement (within 3 dBA) was obtained at all modeling locations.

Table 2-2:Comparison of Year 2000 Measured and Year 2000 Predicted Leq Noise Levels at Peak Hour Receptor Locations

Receptor		Existing Leq Level (dBA)			
No.	Description	Time of Day	Measured	Predicted	Difference
1	Residence, 2 Crestwood Drive (at Route 114)	A.M.	65	64.2	-0.8
		P.M.	65	64.3	-0.7
2	Residence, 69 State Street (Route 25)	A.M.	76	74.1	-1.9
		P.M.	77	75.0	-2.0
3	Residence, 159 Gray Road (Route 4 & 202)	A.M.	66	66.5	+0.5
		P.M.	64	65.2	+1.2
4	Residence, Mosher Farm, Mosher Street (Route 237)	A.M.	65	63.7	-1.3
		P.M.	67	64.1	-2.9
5	Residence, 21 Main Street (Route 25)	A.M.	68	66.1	-1.9
		P.M.	67	65.4	-1.6

Note: A noise model calibration was not performed at locations 6, 7, and 8 because there was no significant traffic at these locations.

3. Alternatives

This Chapter describes the five build alternatives retained for final evaluation along with the No Build Alternative. The five build alternatives, illustrated together on Figure 3-1, page 3-2, are:

- Alternative 1c: A two-lane bypass southwest of Gorham Village connecting Route 114 just south of Day Road to Route 25, west of Cressey Road.
- Alternative 1e: A two-lane bypass southwest of Gorham Village connecting Route 114 just south of Waterhouse Road to Route 25, west of Cressey Road.
- Alternative 6b: A two-lane, southwest bypass of Gorham Village connecting Route 114, just south of Day Road to Route 25 west of Cressey Road, continuing as a northerly bypass of Gorham Village to the intersection of Route 25 and Route 237, also known as Mosher Corner.
- Alternative 6c: A two-lane, southwest bypass of Gorham Village connecting Route 114 just south of Day Road to Route 25 west of Cressey Road, and a separated northerly bypass of Gorham Village connecting Route 25 near West Gorham to Route 25 at Mosher Corner.
- Alternative 6d: A two-lane bypass southwest of Gorham Village connecting Route 114 just south of Waterhouse Road to Route 25, west of Cressey Road, and a separated northerly bypass of Gorham Village connecting Route 25 near West Gorham to Route 25 at Mosher Corner.

The Build Bypass Alternatives would consist of two 3.6 m (12 ft) travel lanes and two 2.4 meter (8 ft) paved shoulders, for a total pavement width of 12 m (40 ft). In areas warranted, an additional 3.6 m (12 ft) truck climbing lane with a 1.2 m (4 ft) paved shoulder in place of the typical 2.4 m (8 ft) paved shoulder is provided. In accordance with MDOT guidelines, the typical roadway right of way would be 60 m (200 ft) wide.

The five bypass alternatives would cross some or all of the following roads: Route 114 north & south of Gorham Village, Route 4/202 northeast & southwest of Gorham Village, Weeks Road, Flaggy Meadow Road, Libby Avenue, and Route 25, east and west of Gorham Village. Access to the bypass would only be provided at U.S. and state numbered routes. Proposed intersections with Routes 114, 4/202, and 25 would be at-grade and signalized. The Libby Avenue, Flaggy Meadow Road and Weeks Road crossings would be grade separated with no access to the new bypass.

3.1 No Build Alternative

The No Build Alternative would provide no new roadway construction or major, capacity-adding reconstruction, except for previously planned projects (see Transportation and Engineering Technical Report, 2002). The present level of maintenance in the Study Area would continue and could include resurfacing, signal improvements, traffic lane marking, signing, shoulder and drainage improvements, and other related activities.

Gorham Bypass Study
Air and NoiseTechnical Report

Bypass Alternatives

Study Area
Highways
Roadways
County Line
Electric Lines
Old RR Grade
Pipelines
Fiber Optic Cable

ALTERNATIVE 1c
Rte 114 S (south of Day Rd) to Rte 25 W

ALTERNATIVE 1e
Rte 114 S (north of Straw Rd) to Rte 25 W

ALTERNATIVE 6b
Rte 114 S to Rte 25 E (west of Cressey)

ALTERNATIVE 6c
Rte 114 S to Rte 25 W
Rte 25 W at West Gorham to Rte 25 E at Mosher Corner

ALTERNATIVE 6d
Rte 114 S (north of Straw Rd) to Rte 25 W
Rte 25 W at West Gorham to Rte 25 E at Mosher Corner

274 0 274 548 822 1096 Meters

2250 0 2250 Feet

Figure 3-1

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3.2 Alternative 1c

Alternative 1c would construct a 3.99 km (2.48 mi) bypass southwest of Gorham Village, connecting Route 114 south of Gorham Village to Route 25 west of Gorham Village. Beginning on Route 114 approximately 180 m (600 ft) south of Day Road, the new bypass would extend along a curve sweeping to the north to the Weeks Road crossing. Weeks Road would be redesigned to bridge over the new roadway. The new bypass would continue under Weeks Road, cross an existing stream (Gully Brook), and continue northerly to connect to Route 4/202 approximately 1.6 km (one mi) west of Gorham Village.

From Route 4/202, the bypass would extend to the north, parallel to and west of Cressey Road, to the Flaggy Meadow Road crossing. Flaggy Meadow Road would be redesigned to bridge over the bypass. The bypass would extend under Flaggy Meadow Road and continue north, parallel to and west of Cressey Road to connect with Route 25 approximately 1.6 km (one mi) west of Gorham Village.

3.3 Alternative 1e

Alternative 1e would construct a 5.36 km (3.33 mi) bypass southwest of Gorham Village, connecting Route 114 south of Gorham Village to Route 25 west of Gorham Village.

Beginning on Route 114 approximately 430 m (1,400 ft) south of Waterhouse Road, the new bypass would extend west, parallel to and south of Waterhouse Road. It would then sweep to the north, cross two existing streams (Gully Brook and unnamed tributary to Gully Brook), and continue northerly to connect to Route 4/202 approximately 1.6 km (one mi) west of Gorham Village.

From Route 4/202 to Route 25, Alternative 1e would be the same alignment as Alternative 1c.

3.4 Alternative 6b

Alternative 6b would construct a 10.54 km (6.5 mi) bypass north and southwest of Gorham Village, connecting Route 114 south of Gorham Village to Route 25 west and east of Gorham Village.

The southwestern portion of this alternative, from Route 114 south of Gorham Village to Route 25 west of Gorham Village would be on a similar alignment to Alternative 1c.

From Route 25, the bypass would extend 2,010 m (6,600 ft) along a curve sweeping to the east, where it would connect with Route 114 approximately 1.6 km (one mi) north of Gorham Village.

From Route 114, the bypass would extend 1,830 m (6,000 ft) to the east, cross an existing stream (Tannery Brook), and connect to Route 4/202 approximately 1.6 km (one mi) east of Gorham Village.

From Route 4/202, the bypass would extend easterly, cross Libby Avenue, sweep

north/northeast and cross an existing stream (unnamed tributary to Mosher Brook), and continue southeast to connect to the intersection of Route 25 and Route 237 (Mosher Corner) approximately 3.7 km (2.3 mi) east of Gorham Village.

3.5 Alternative 6c

Alternative 6c would construct a 12.18 km (7.57 mi) separated bypass north and southwest of Gorham Village, connecting Route 114 south of Gorham Village to Route 25 west and east of Gorham Village.

The southwest portion of this alternative, from Route 114 south of Gorham Village to Route 25 west of Gorham Village would be on the same alignment as Alternative 1c, except for the configuration of its intersection with Route 25. This reconfigured intersection, located approximately 340 m (1,100 ft) west of Cressey Road, would realign traffic movements between the bypass and the westerly leg of Route 25 as direct movements. The easterly leg of Route 25 would be realigned to form the stem of a new signalized, at-grade "T", intersection.

The northern portion of this alternative would be separate from the southwest portion, and the portions would not be directly connected. Beginning on Route 25, approximately 170 m (570 ft) east of Rust Road and 4 km (2.5 mi) northwest of Gorham Village, the new bypass would extend 490 m (1,600 ft) along a curve sweeping to the northeast, where it would connect with a realigned segment of Route 25. Traffic movements between the bypass and the westerly leg of Route 25 would be realigned as direct movements. The easterly leg of Route 25 would be realigned to form the stem of a new signalized, at-grade "T", intersection.

From the Route 25 intersection, the bypass would extend 2,900 m (9,500 ft) along a curve sweeping to the northeast, bridge over an existing stream (Little River), continue east, parallel to and north of Lovers Lane to connect with Route 114 approximately 1.6 km (one mi) north of Gorham Village.

Toward the east, the remaining segments of this alternative, from Route 114 to the intersection of Route 25 and Route 237, would be on the same alignment as Alternative 6b.

3.6 Alternative 6d

Alternative 6d would construct a 13.55 km (8.42 mi) separated bypass north and southwest of Gorham Village.

The southwest portion of this alternative, from Route 114 south of Gorham Village to Route 25 west of Gorham Village would be on the same alignment as Alternative 1e, except for the configuration of its intersection with Route 25. This reconfigured intersection, located approximately 340 m (1,100 ft) west of Cressey Road, would realign traffic movements between the bypass and the westerly leg of Route 25 as direct movements. The easterly leg of Route 25 would be realigned to form the stem of a new signalized, at-grade "T", intersection. The northern portion of this alternative would be on the same alignment as the northern portion of Alternative 6c.

4. Environmental Consequences

4.1 Air Quality

Under the No Build Alternative, growth in traffic due to normal population growth will tend to result in increased vehicle emissions. The growth in traffic will be offset somewhat by a decrease in motor vehicle emission factors as older and more polluting vehicles in the nation's fleet are replaced with new vehicles which have lower emission rates, as prescribed in the "Federal Motor Vehicles Emission Control Program" (FMVECP) mandated in the "Clean Air Act". These offsetting factors would likely result in small increases in CO emissions and local concentrations.

4.1.1 Mesoscale Assessment

Cumberland County in Maine is currently classified as in attainment for all criteria pollutants, except for ozone. The Study Area is presently classified as a Moderate Ozone Nonattainment Area, pursuant to the CAAA. "Moderate" Ozone Nonattainment Areas are defined as geographical areas with an average hourly design value ranging from 0.138 ppm to 0.160 ppm based on three consecutive years of monitoring data. The one-hour NAAQS for ozone is 0.12 ppm, which is not to be exceeded more than once per year, averaged over three years.

The Study Area is located within the geographical boundaries of Air Quality Planning Area #1 (York, Cumberland, Sagadahoc Moderate Nonattainment Area), which is under the combined jurisdiction of the Portland Area Comprehensive Transportation Committee (PACTS) and the State of Maine. Although this study was included in the Maine Statewide Transportation Improvement Program (STIP) for Fiscal 2002, 2003, and 2004 (July 2001), the project was not explicitly accounted for in the air quality conformity analysis. Therefore, this project must be included in a future update to the STIP when project funding becomes available.

4.1.2 Microscale Assessment

In addition to the mesoscale assessment described above, potential impacts of the project on localized carbon monoxide (CO) concentrations were assessed. The EPA conformity regulations at 40 CFR 93.116 require that the project not create or contribute to a new violation of the NAAQS, nor worsen any existing violation of the NAAQS. Because traffic would be routed away from Gorham Village with any of the Build Bypass Alternatives, CO concentrations in Gorham Village would be reduced and no violations of the 1-hour and 8-hour CO standards are anticipated. The proposed bypass would introduce traffic into an area where there is currently no traffic, causing a slight increase in CO concentrations in the vicinity of the bypass alignment. With the traffic volumes and travel speeds anticipated on the bypass, this slight increase in local CO concentrations is not anticipated to lead to any violations of the CO standards.

An Upgrade Alternative was considered which would increase roadway and intersection capacities by adding travel and turning lanes along Route 25 and Route 114 in the immediate Gorham Village area. The Upgrade Alternative would eliminate the bottleneck at the intersection of Route 25 and Route 114 and improve the level of service at the

intersection. While there will likely be a small increase in local traffic, these improvements would result in a small decrease in overall travel time and delay through Gorham Village, resulting in a small reduction in CO concentrations.

These conclusions are based on previous analyses for similar projects, such as the I-295 Portland Maine, Connector Road Environmental Assessment, the Bangor Maine I-95/Stillwater Avenue Interchange Project, and the Dover-Rochester-Somersworth Spaulding Turnpike (NH) Exit 10 Environmental Impact Statement.

4.1.3 Construction Impacts Assessment

Construction activities may result in short-term impacts on ambient air quality. These potential impacts include direct emissions from construction equipment and trucks, fugitive dust emissions, and increased emissions from motor vehicles on the roads due to traffic disruption. These impacts will be temporary, and will affect the immediate vicinity of the construction sites and their access routes. Mitigation measures are discussed in Section 5.1, page 5-1.

4.2 Noise

As indicated in Table 2-1, page 2-3, the noise measurement results in Gorham Village and along the existing major roads already approach or exceed the FHWA noise impact criteria at several locations. For the No-Build and Upgrade Alternatives in the design year 2025, peak-hour traffic volumes on the major roads in the Study Area are expected to increase by 20 to 30 percent (see Transportation and Engineering Technical Report, 2002). This increase in traffic volume will result in approximately a one dBA increase in traffic noise levels relative to existing noise levels. In general, the traffic volumes would have to double in order to generate a perceptible three dBA increase in traffic noise levels. In addition, the Upgrade Alternative will also bring local street traffic closer to residential receptors in the vicinity of the upgrades resulting in slightly higher noise levels in these areas. As a result, for the No-Build and Upgrade Alternatives, the number of residential receptors that will exceed the FHWA noise criteria will increase over existing conditions.

4.2.1 Traffic Noise Assessment

A noise impact is considered to occur when the predicted traffic noise level approaches (within one dBA) or exceeds the FHWA's Noise Abatement Criteria (NAC) contained in 23 CFR 772. The FHWA has established an hourly Leq NAC of 67 dBA for residential receptors, and 72 dBA for commercial receptors. In addition, MDOT's Highway Traffic Noise Policy states that a noise impact will also occur if the difference between the existing Leq noise level and the predicted noise level for the build alternatives is 15 dBA or greater.

Projected PM peak hour traffic volumes for the design year 2025 were used in the analysis for the Build Alternatives. Five Build Alternatives (1c, 1e, 6b, 6c, and 6d) were evaluated for the proposed Gorham Bypass Study. The percentage of trucks for the various bypass alternatives ranged from 3 to 4 percent of the total peak hour traffic volume. For this analysis, traffic was modeled at a speed of 80 kilometers per hour (50 mph) on the proposed Gorham Bypass.

Using the TNM noise model, traffic noise levels were predicted at the residential receptor locations along the Build Alternatives 1c,1e, 6b, and 6c. For Alternative 6d, which is a composite of segments of Alternative 1e and Alternative 6c, a separate noise modeling analysis was not performed. Instead, the noise impact assessment for Alternative 6d was summarized from the noise modeling results for Alternatives 1e and 6c. Table 4-1 compares the noise levels at each of the eight noise measurement locations (see Figure 2-1, page 2-2) for the existing, future No-Build Alternative, and future Build Alternatives.

Table 4-1: Noise Level Summary (in dBA) at each of the Measurement Locations – Year 2025

Receptor #	Existing	No-Build	Alt. 1c	Alt. 1e	Alt. 6b	Alt. 6c	Alt. 6d
1	65	66	65	65	65	66	65
2	77	78	78	78	78	78	78
3	64	65	65	65	66	66	66
4	67	68	68	68	68	68	68
5	67	68	68	68	67	67	67
6	36	36	52	52	52	52	52
7	42	42	42	58	42	42	58
8	43	43	43	43	46	46	46

For each of the alternatives, the total number of impacted receptors is summarized in Table 4-2. In addition, these impacts are identified as either exceeding the FHWA's NAC of 67 dBA for residential receptors, or the MDOT criterion of 15 dBA over existing noise levels.

Table 4-2: Number of Impacted Receptors for Build Alternatives – Year 2025

Alternative	Description	Number of Receptors Exceeding FHWA NAC	Number of Receptors Exceeding MDOT >15 dBA	Total Number of Impacted Receptors
1c	Route 114 S to Route 25 W.	5 (1)	13	18
1e	Route 114 to Route 25 W. S. (longer southern link)	6 (0)	8	14
6b	Route 25 W. to Route 25/237 E plus Alternative 1c	9 (1)	13	22
6c	Route 25 W. to Route 25/237 E plus Alternative 1c	10 (1)	19	29
6d	Route 25 W. to Route 25/237 E plus Alternative 1e	14 (0)	14	28

Note: The number in parentheses indicates the number of impacted receptors that already approach or exceed the FHWA NAC under existing conditions.

For Alternative 1c, a total of 18 residential receptors are expected to be impacted by traffic noise from the bypass. Noise levels at five of these residential receptors will exceed the FHWA's NAC of 67 dBA. Three of these receptors are located along Cressey Road, one at the intersection with Route 4/202, and one on Crestwood Road at the intersection with Route 114 South. The receptor located on Crestwood Road already approaches FHWA's noise abatement criteria. In addition, noise levels at thirteen residential receptors will exceed MDOT's criteria of 15 dBA above existing ambient noise levels, although these noise levels will still be below the FHWA impact levels of 67 dBA. Eight of these receptors are on Adeline Drive where the measured ambient noise level is 36 dBA. Traffic noise levels from the bypass are expected to result in noise levels in the area of Adeline Drive that range from 47 to 53 dBA. As a result, eight of the residential receptors along Adeline Drive will exceed MDOT's 15 dBA increase criterion of 51 dBA (36 dBA + 15 dBA). In addition, three residential receptors on Briarwood Lane, and two on Crestwood Road will also exceed MDOT's noise criterion of 58 dBA (43 dBA + 15 dBA) at these locations.

For Alternative 1e, a total of 14 residential receptors are expected to be impacted by traffic noise from the bypass. Noise levels at six of these residential receptors will exceed the FHWA's NAC of 67 dBA. Three of these receptors are located on Cressey Road, one at the intersection with Route 4/202, and one each along Waterhouse Road (north of the alignment) and Straw Road (south of the alignment) where the alignment intersects with Route 114 South. None of these receptors currently approaches or exceeds the FHWA's noise abatement criteria. In addition, levels at eight residential receptors will exceed MDOT's 15 dBA noise increase criterion although these noise levels will still be below the FHWA impact levels of 67 dBA. Five of these receptors are along Adeline Drive, and three are on Briarwood Lane. Compared to Alternative 1c, the slight reduction in the number of impacted receptors along Adeline Drive is due to the fact that the bypass begins to curve farther south for Alternative 1e.

For Alternative 6b, a total of 22 residential receptors are expected to be impacted by traffic noise from the bypass. Noise levels at nine of these residential receptors will exceed the FHWA's NAC of 67 dBA. Three are located on Cressey Road south of Route 25, one on Cressey Road north of Route 25, one at the intersection of Briarwood Lane and Route 4/202 South, one at the intersection of Crestwood Road and Route 114 South, two at the intersection with Route 4/202 North, and one at the intersection of Libby Avenue. The receptor located on Crestwood Road already approaches FHWA's noise abatement criteria. In addition, levels at thirteen residential receptors will exceed MDOT's 15 dBA noise increase criterion, although these noise levels will still be below the FHWA impact levels of 67 dBA. Eight of these receptors are on Adeline Drive, three are on Briarwood Lane, and two are on Crestwood Road.

For Alternative 6c, a total of 29 residential receptors are expected to be impacted by traffic noise from the bypass. Noise levels at ten of these residential receptors will exceed the FHWA's NAC of 67 dBA. One of these receptors is located on Crestwood Road at the intersection with Route 114 South, one at the intersection with Route 4/202 South, five along Route 25 West, two at the intersection of Route 4/202 North, and one at the intersection with Libby Avenue. The receptor located on Crestwood Road already approaches FHWA's noise abatement criteria. In addition, levels at 19 residential receptors will exceed MDOT's 15 dBA noise increase criterion, although these noise levels will still be below the FHWA impact levels of 67 dBA. Two of these receptors are

located along Crestwood Road, three on Briarwood Lane, eight on Adeline Drive, four along the residential cul-de-sac north of the alignment off of Route 114 North, and two are located south of the alignment in the new housing development between Libby Avenue and Doloff Road.

For Alternative 6d, a total of 28 residential receptors are expected to be impacted by traffic noise from the bypass. Noise levels at 14 of these residential receptors will exceed FHWA's NAC of 67 dBA. One receptor is located at the intersection with Libby Avenue, two receptors at the intersection with Route 4/202, five receptors along Route 25 west, three receptors along Cressey Road, one receptor at the intersection with Route 4/202, one receptor along Waterhouse Road, and one receptor along Straw Road. None of these receptors currently approaches or exceeds the FHWA's noise abatement criteria. In addition, noise levels at 14 residential receptors will exceed MDOT's 15 dBA noise increase criterion, although these noise levels will still be below the FHWA impact levels of 67 dBA. Two receptors are located in the residential development between Doloff Road and Libby Avenue, four receptors along the cul-de-sac north of the bypass alignment off of Route 114 north, three receptors along Briarwood Lane, and five receptors along Adeline Drive.

Compared to the No-Build Alternative, Alternative 6b will have the most effect in reducing traffic volumes in Gorham Village and along the major roads leading into Gorham Village. In addition, the Build Bypass Alternatives will also reduce truck traffic through Gorham Village. These reductions in traffic volume and truck traffic will result in a one dBA reduction in noise levels in Gorham Village and along the major roads leading into Gorham Village. To the extent that the other bypass alternatives (1c, 1e, 6c and 6d) do not result in the same levels of reduction in traffic volumes and truck traffic in Gorham Village, the expected noise reduction will be less than that obtained from Alternative 6b. In addition, when compared to the existing conditions, Alternative 6b will also result in a decrease in traffic volume and truck traffic in Gorham Village. This improvement will result in a slight decrease in traffic noise levels when compared to existing conditions.

4.2.2 Construction Noise Assessment

Construction activities for the Gorham Bypass will include clearing, excavation, materials hauling, grading, and paving. Heavy machinery is the major noise source in construction. Typical examples of heavy equipment used for highway construction projects include trucks, bulldozers, front end loaders, scrapers, rock drills and pavers. Table 4-3, page 4-6 shows typical noise levels from a variety of construction equipment that may be used at various stages of highway construction. Based on the equipment typically present for each phase of highway construction, the length of equipment duty cycles, and equipment noise levels, average noise levels could range from 78 to 90 dBA at 15 meters (50 feet) from the noisiest piece of equipment.

In addition, short term blasting of bedrock may be required for this project. Typical blasting activity generates Lmax noise levels of 94 to 98 dBA at a distance of 15 meters (50 feet) from the source, depending on the size of the charge. However, blasting represents an intermittent noise source that can be mitigated by using a blast safety blanket that would also muffle the blast noise.

Table 4-2: Construction Equipment Lmax Noise Levels

Equipment	Noise Levels (dBA at 15m (50 ft))
Earthmoving	
Front End Loader	84
Backhoes	84
Bulldozers	88
Tractors	84
Scrapers	90
Graders	83
Trucks	90
Pavers	84
Vibrators	76
Materials Handling	
Concrete Mixer	83
Crane	82
Derrick	88
Stationary	
Pumps	71
Generators	81
Compressors	89
Impact Devices	
Pile Drivers	91
Pavement Breakers	89
Pneumatic Tools	80

Source: Highway Construction Noise: Environmental Assessment and Abatement, Volume IV: User's Manual. Vanderbilt University. Nashville, TN. Report No. VTR 81-3. 1981.

5. Mitigation

5.1 Air Quality

The Gorham Bypass project is not anticipated to create or contribute to a new violation of the NAAQS, nor worsen any existing violation of the NAAQS. Therefore, no long-term air quality mitigation measures are required.

5.2 Noise

In accordance with FHWA and MDOT's Highway Traffic Noise Policy, noise barriers were evaluated as possible noise mitigation measures for all impacted receptors. In addition, MDOT, as part of their reasonableness criteria, has established a noise barrier cost effectiveness goal of $20,000 per benefited receptor. A benefited receptor must receive a minimum of 5 dBA insertion loss to be considered in the cost effectiveness analysis. Using a typical barrier cost of $20 per square foot, noise barriers were not considered to be cost effective for this project. In most instances, the impacted receptors were too dispersed along the bypass alignments to result in a cost effective barrier design. In areas where there were clusters of impacted receptors, such as along Adeline Drive, these receptors are located too far (approxiamtely 75 m [250ft]) from the roadway corridor to receive the necessary 5 dBA insertion loss required by MDOT's cost effectiveness analysis. As a result, noise barriers for this project do not satisfy MDOT's cost effectiveness criteria, and are not feasible for this project.

Construction noise impacts can be mitigated by installing mufflers, enclosures, and noise barriers, and by restricting construction activities to daytime hours that are relatively less sensitive to noise because most residents will be awake.

APPENDIX A

① - AM

Noise Measurement Data Sheet

Project: Date: 12-500 pg.

Receptor: 2 Crestwood Dr. Technician(s): TDH/BTS

Measurement Results:

Leq: 64.7 L10: 68.4

Start: 7:00 Lmax: 76.4 L90: 51.6

delT: 20 min

Stop: 7:20 Lmin: 44.3 Events:

SLM Equipment: LD820 Pre Calibration: 113.9 (114.0)

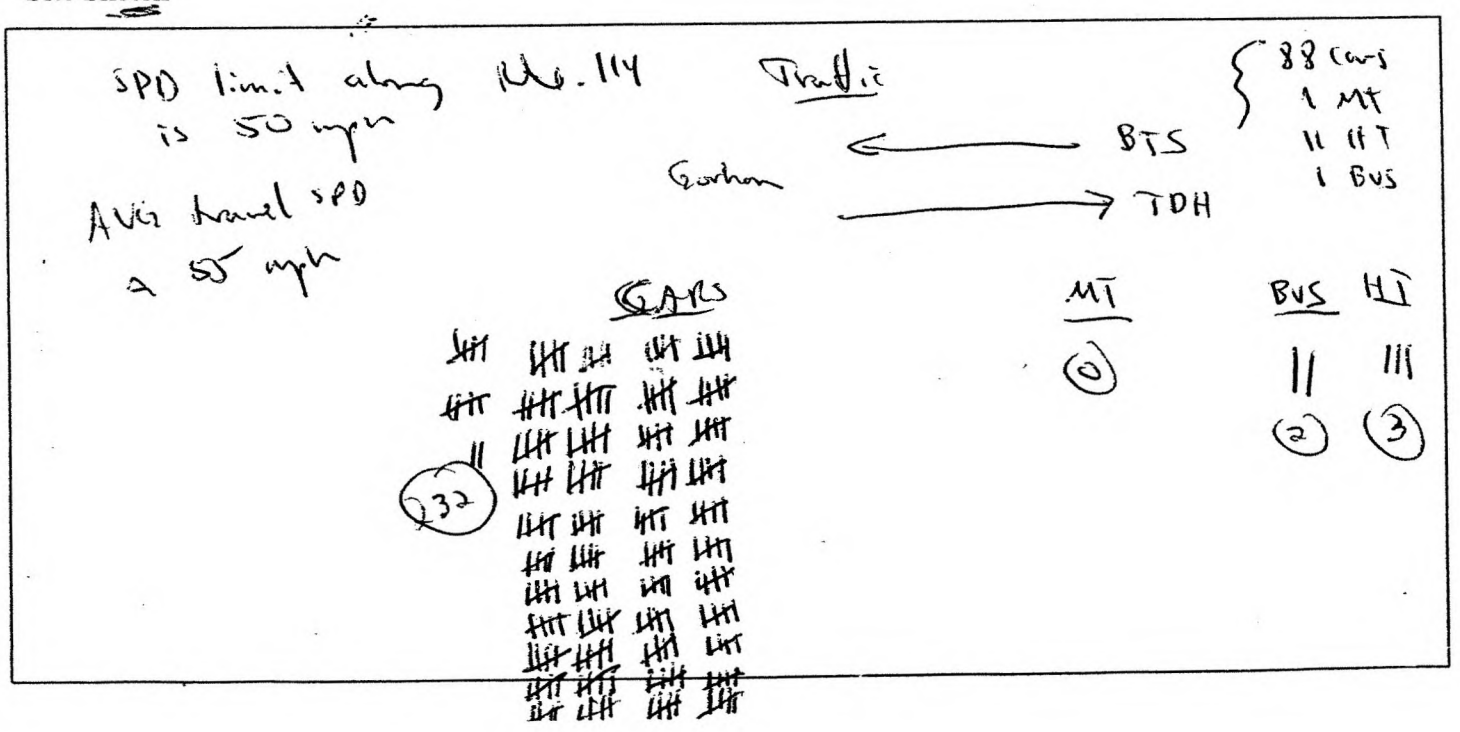
Met. Conditions: WS: 1-2 T°F: 19 Sky: cloudy

Notes/Observed Noise Sources:

— 1 ACFT overflight - DCA to PWM

- photos : "21,20

Site Sketch



①- PM

Noise Measurement Data Sheet

Project: MDOT Gorham Bypass Date: 12-4-03 pg.

Receptor: 2 Crestwood Dr. Technician(s): TDH/BFS

Measurement Results: Leq: 65.4 L10: 68.3

Start: 16:00 Lmax: 76.5 L90: 53.5

delT: 20 min

Stop: 16:20 Lmin: 43.6 Events: ______

SLM Equipment: LD820 Calibration: 114.0 (114.0)

Met. Conditions: WS: Calm T°F: 35 Sky: clear

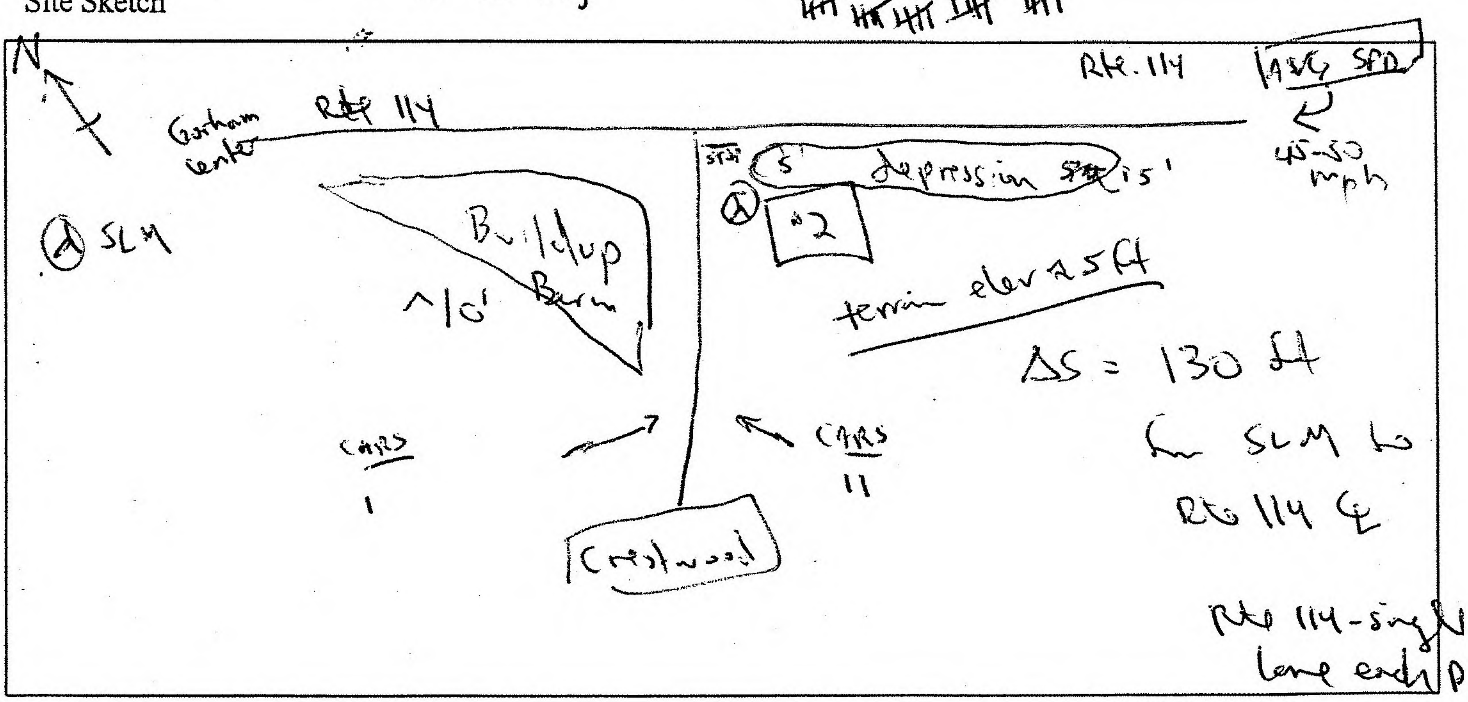
Notes/Observed Noise Sources:

dominant NE source - traffic along Rte 114
- cars along Rte 114 - 60-63
  HT passby 70-74 dB
- NJ ACPT overflights - 55 dB / 65
- ~~AVG SP~~ - Half-moon @ 2 o'clock in SE sky

NB	CARS	MT	HT	other
(198)	[tally marks]	111 (2)	1111 (5)	

SB	CARS	MT	HT	OTHER
(122)	[tally marks]	1111 (4)	1111 (4)	BUS (1)

Site Sketch



(2) - AM

Noise Measurement Data Sheet

Project: Date: 12-5-03 pg.

Receptor: 257 Narragansett St. (Rte. 202) Technician(s): TOH/BTS
tel. 207-839-4634 (Flaherty Family Hair Care)

Measurement Results:

Leq: 68.0 L10: 72.4

Start: 7:30 Lmax: 37.0 L90: 51.8

delT: 20 min

Stop: 7:50 Lmin: 85.1 Events:

SLM Equipment: LD820 Calibration: 113.9 (114.0)

Met. Conditions: WS: Calm T°F: 20+ Sky: cloudy

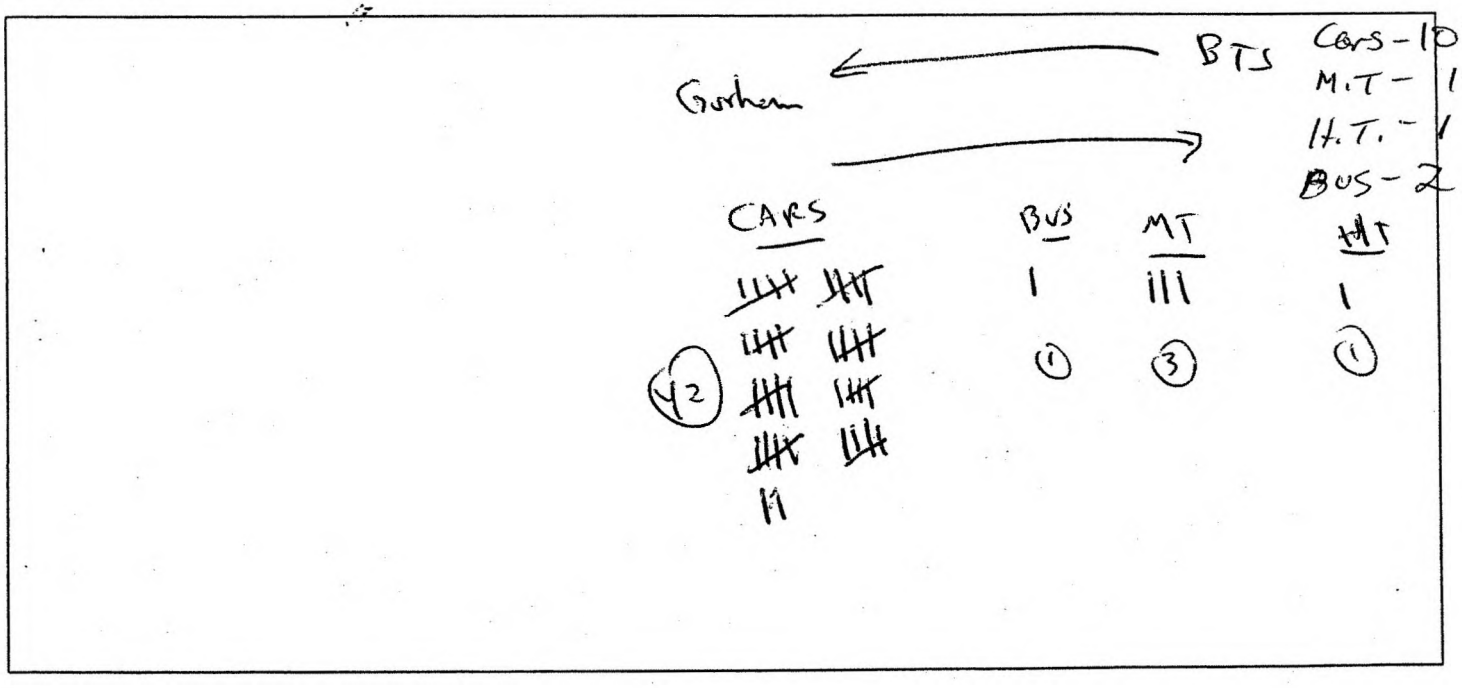
Notes/Observed Noise Sources:

- Mod. traffic along 202 - very few HT

- Avg. SPD 50-55

- photos 19, 18

Site Sketch



② - PM

Noise Measurement Data Sheet

Project: MDOT Gorham ByPass | Date: 12-4-02 pg.

Receptor: 257 Narragansett St. (Rte. 202) Res. & Commercial (Elaine's Family Haircare) | Technician(s): TDH/BTS

Measurement Results: | Leq: 68.5 | L10: 72.4

Start: 16:40 | Lmax: 39.9 | L90: 49.1

delT: 20 min

Stop: 17:00 | Lmin: 85.3 | Events: H

SLM Equipment: LD 820 | Calibration: 113.9 (114.0) Avg. w/ Beg & End

Met. Conditions: WS: calm | T°F: <32 | Sky: Clear

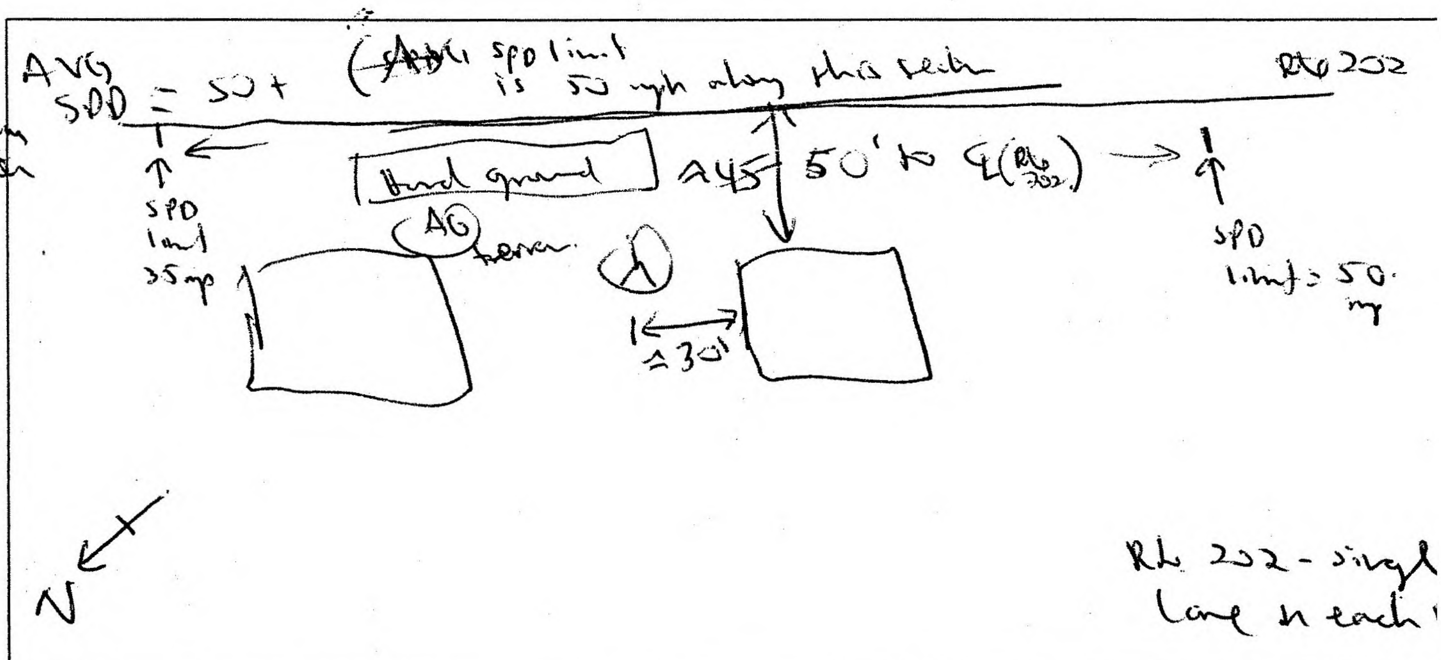
Notes/Observed Noise Sources:

— Traffic along Rte 202 (Narrag.) dominates

	CARS	MT	HT
←	80	5	9
→	66	5	2

146

Site Sketch



(3) - AM

Noise Measurement Data Sheet

Project: Date: 12-5-00 pg.

Receptor: 69 State St. (Rt. 25) Technician(s): TDH/BTS

Measurement Results: Leq: 75.8 L10: 79.7

Start: 8:05 Lmax: 88.8 L90: 58.9

delT: 20 min

Stop: 8:25 Lmin: 45.6 Events: ____

SLM Equipment: LD 820 END Calibration: 112.6 (114.0)

Met. Conditions: WS: Calm T°F: ~25 Sky: Cloudy

Notes/Observed Noise Sources:

- traffic along Rte. 25 dominates NZ environment

- Photos # 17, 16

- construction worker dismantling signs ~ 150 ft North of (1) — NZ meas were NOT conducted during any const. NE!
  → however, traffic flow does NOT seem to be disrupted as a result – SPD still exceed 50+ mph!

Site Sketch outbound SPD limit = 50 mph – AVG travel SPD ≈ 55-60 (45 dw)

Graham ——→ TDH | 225 CARS, 4 MT, 9 HT } ←—— BTS

TDH				BTS		
CARS	MT	HT	BUS	CARS	MT	HT
tallies (54)	tallies (6)	tallies (5)	tallies (2)	tallies (41)	1	

(3) - PM

Noise Measurement Data Sheet

Project: MDOT Gorham Crosstown Rd Date: 12-4-09 pg.

Receptor: 69 State St. (Rt. 25) Technician(s): TPH / BTS

Measurement Results:

Leq: 76.7 L10: 86.6

Start: 17:10 Lmax: 87.8 L90: 61.3

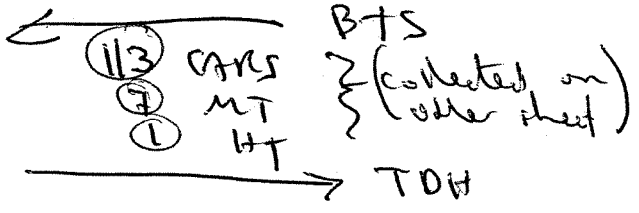
Stop: 17:30 delT: 20.00 Lmin: 52.9 Events:

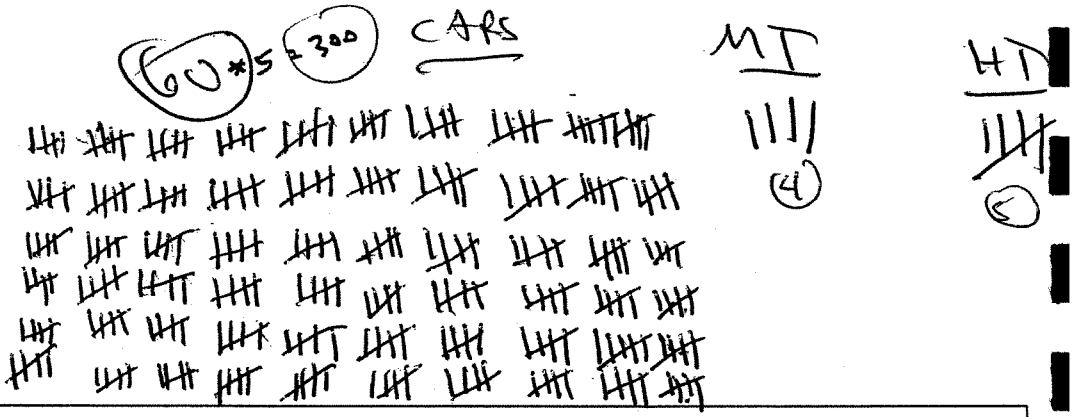
SLM Equipment: Calibration: 113.8 (114.0) END

Met. Conditions: WS: Calm T°F: <25 Sky: Clear

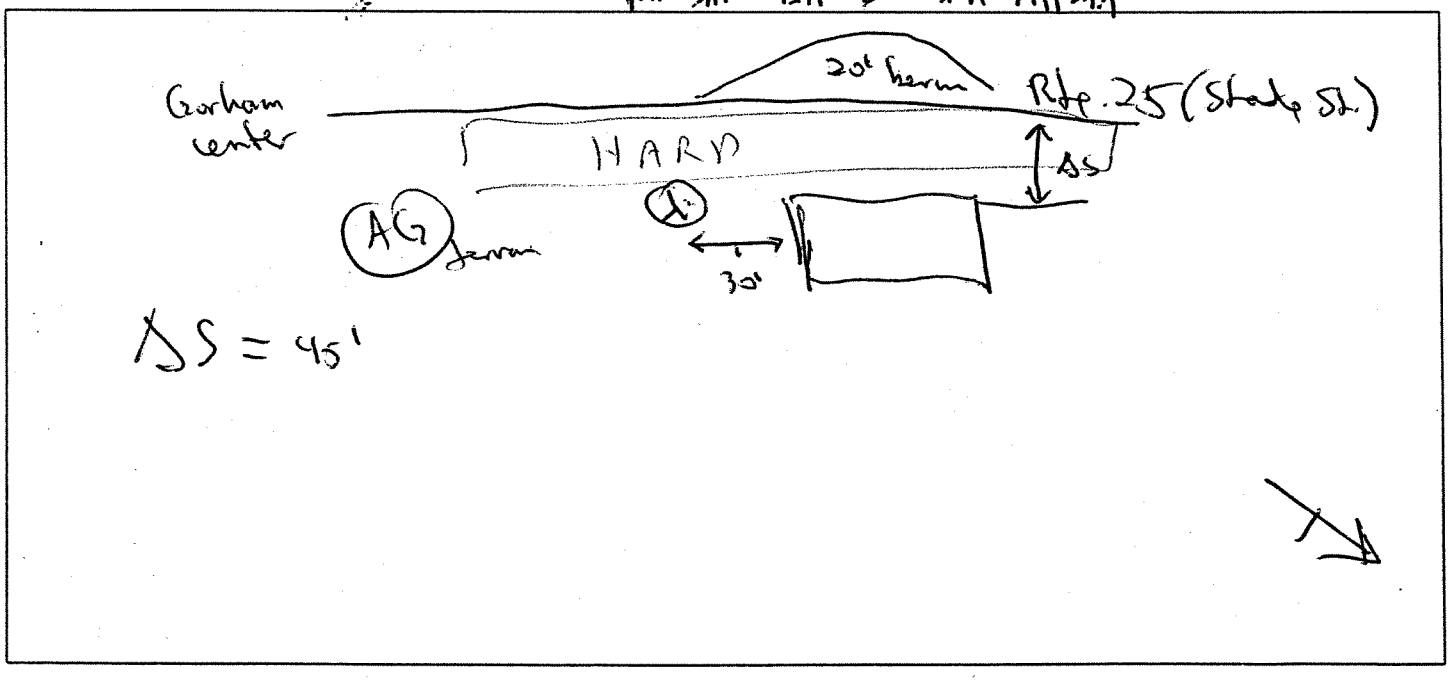
Notes/Observed Noise Sources:

- dominant NZ → Rt 25
- no No other major sources





Site Sketch



(4) - PM

Noise Measurement Data Sheet

Project: MDOT Gorham Bypass Date: 12-5-00 pg.

Receptor: 159 Gray Rd (Rtes. 4 & 202) Technician(s): TDH/BTS

Measurement Results: Leq: 64.0 L10: 69.5

Start: 16:33 delT: 20 min Lmax: 76.7 L90: 42.4

Stop: 16:53 Lmin: 39.3 Events: —

SLM Equipment: LD820 Calibration: 113.9 (114.0) from Beg. Cal

Met. Conditions: WS: 1-2 mph T°F: 35 Sky: Cloudy

Notes/Observed Noise Sources:

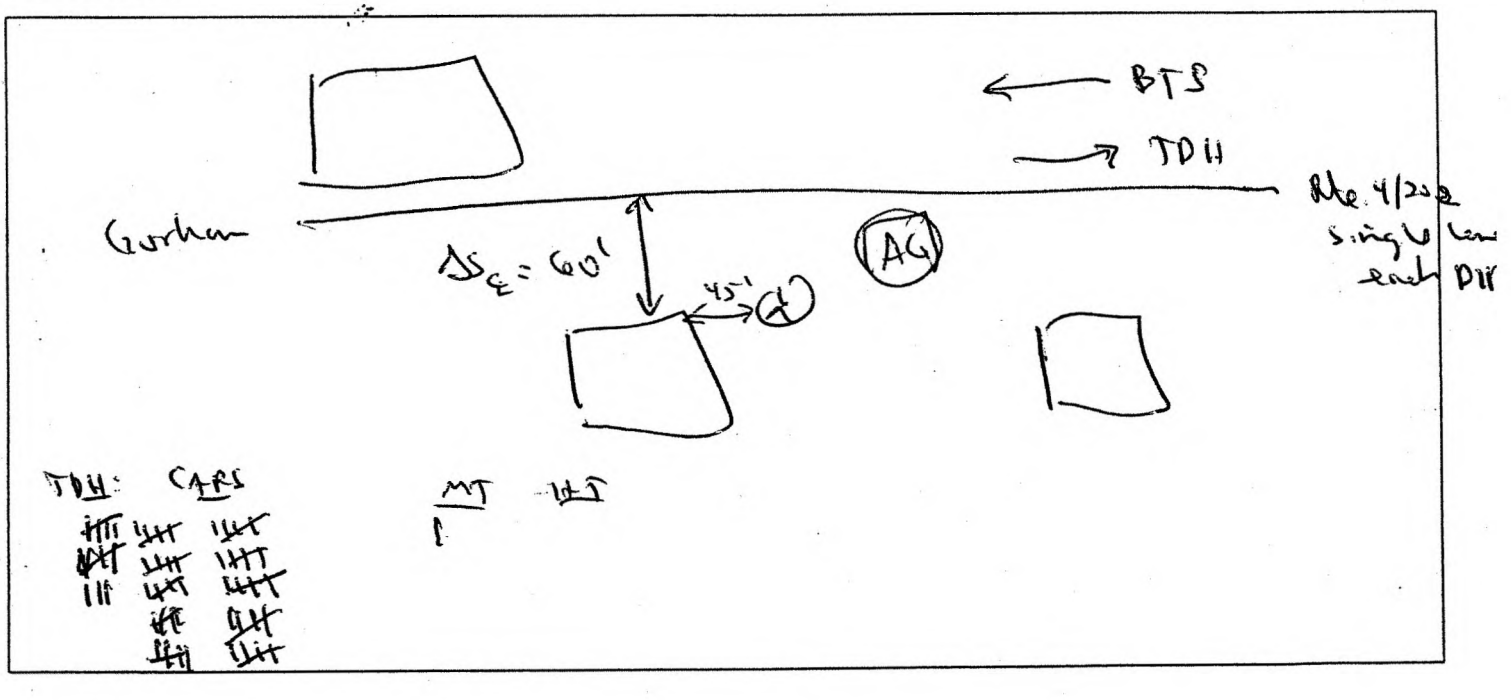
- dom. NZ source is Rte 202 traffic
- No other local side street traffic or ACFT overflights
- single car passby near Lane - 72-74
- BKGD = 42 dB - rustling leaves only

	BTS	TDH
CARS	29	63
MT	2	1
HT	—	—

Spd limit = 50

Avg Spd ≈ 55-60

Site Sketch



(4) - AM

Noise Measurement Data Sheet

Project: MDOT Gorham Bypass Date: 12-6-00 pg.

Receptor: 159 Gray Rd. (Rts 4 & 202) Technician(s): BTS / TDH

Measurement Results: Leq: 65.6 L10: 70.2

Start: 7:30 Lmax: 80.7 L90: 42.5

delT: 20 min

Stop: 7:50 Lmin: 37.6 Events:

SLM Equipment: LD 820 Calibration: 112.7 (114.0) from prev.

Met. Conditions: WS: ~~10-15 mph~~ Calm T°F: 16° Sky: Clear

Notes/Observed Noise Sources:

- ~~Speed Limit~~ BTS
- light traffic along Gray Rd.

CARS - 75
BUSES - 3
MT - 2
HT - 1

BTS ←

Gorham

→ TDH

CARS	MT	HT
𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	11	

Site Sketch

(5) - AM

Noise Measurement Data Sheet

Project: MDOT Gorham Bypass Date: 12-6-00 pg.

Receptor: ~~21 Main Str. (Rte 25) - Intersection~~ Mosher Farm #426 Technician(s): BTS / TDH

Measurement Results: Leq: 64.9 L10: 68.1

Start: 7:00 Lmax: 79.7 L90: 57.8

delT: 20 min

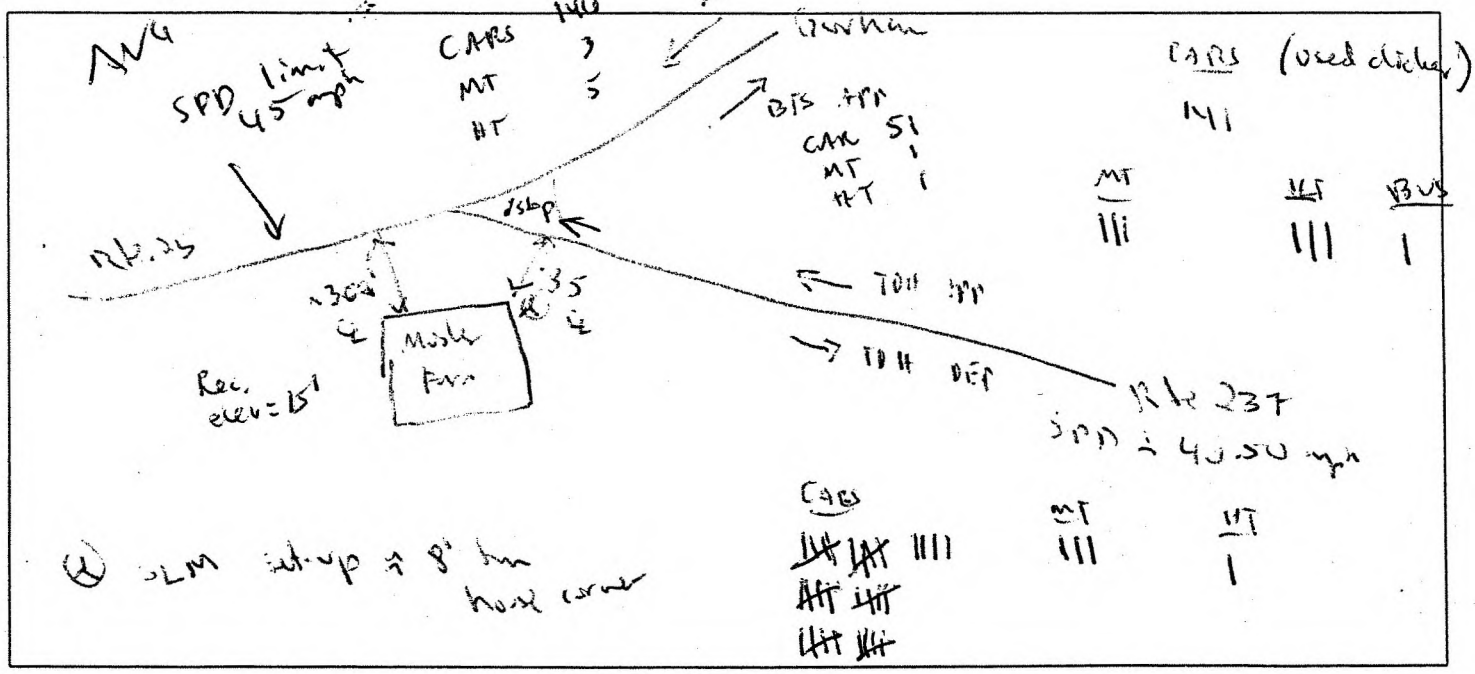
Stop: 7:20 Lmin: 51.9 Events:

SLM Equipment: LD820 Pre Calibration: 112.7 (114.0)

Met. Conditions: WS: 10-15 mph T°F: ~~<30~~ 16 Sky: clear

Notes/Observed Noise Sources:

Site Sketch



(5) - PM

Noise Measurement Data Sheet

Project: MDOT Gorham Bypass Date: 12-5-03 pg.

Receptor: Mosher Farm - Mosher Str. Technician(s): TDH / BTS

Measurement Results: Leq: 66.7 L10: 69.7

Start: 17:05 delT: 20 min Lmax: 75.6 L90: 60.1

Stop: 17:25 Lmin: 53.0 Events:

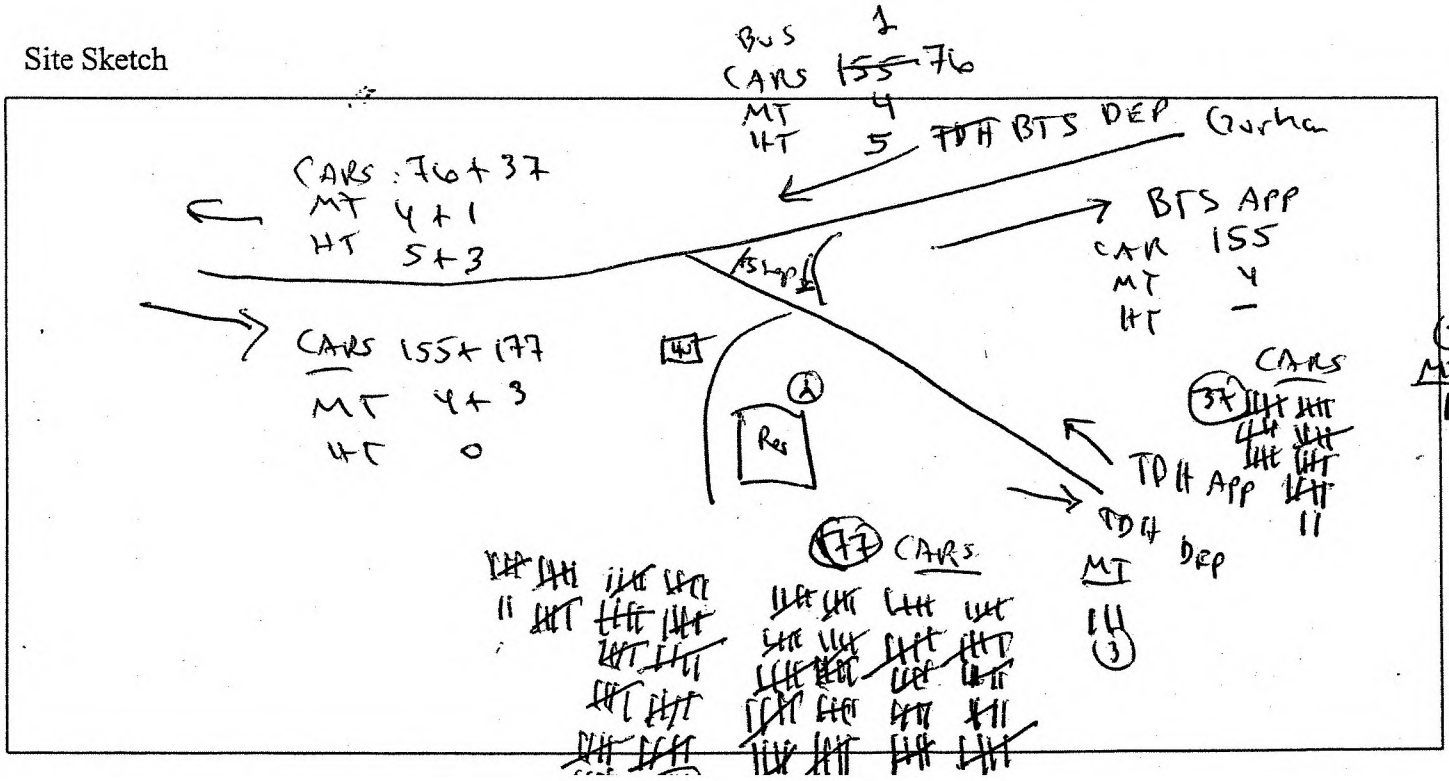
SLM Equipment: LD 820 and Calibration: 113.1 (114.0)

Met. Conditions: WS: Calm T°F: 43° Sky: cloudy

Notes/Observed Noise Sources:

- dominant NE - traffic on Rte 25

Site Sketch



⑥ - AM

Noise Measurement Data Sheet

Project: MDOT Gorham Bypass

Date: 12-6-00 pg.

Receptor: 21 Main Str. ~~Mosher Str. (Mosher Farm)~~

Technician(s): BTS / TDH

Measurement Results:

Start:	8:05	Leq:	67.8	L10:	70.9
		Lmax:	82.1	L90:	60.0
Stop:	8:25	Lmin:	52.6	Events:	

delT: 20 min

SLM Equipment: LD820

Calibration: 112.7 (114.0)

Met. Conditions: WS: 1-2 T°F: 16 Sky: Clear

Notes/Observed Noise Sources:

CARS MT HT

120

TDH (west) WB

Cars	MT	HT	Other
120	6	15	

BTS (east) EB

Cars	MT	HT	Other
180	1	15	1

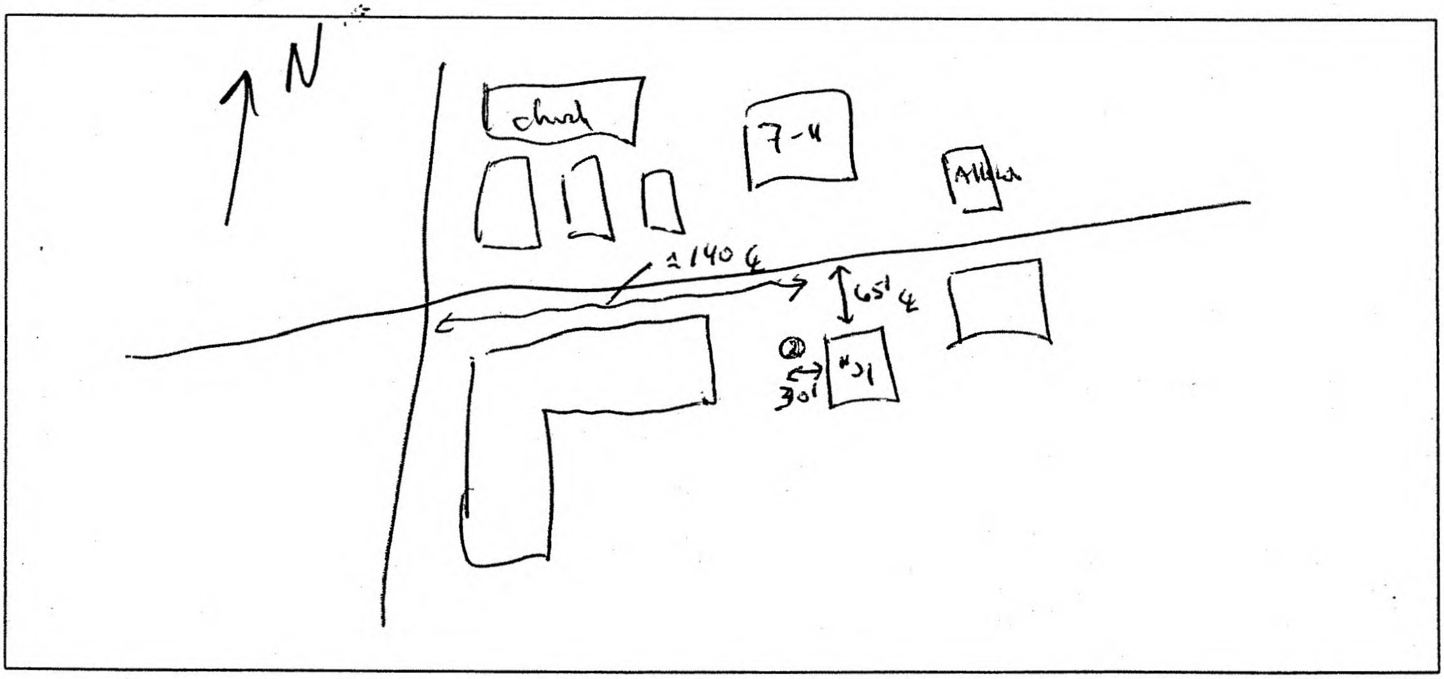
Gorham ← TDH - WB

→ BTS - EB

- SPD limit along Rte. 25 near Gorham is 25 mph

Avg. SPD = 30-35 FF!

Site Sketch



⑥ - PM

Noise Measurement Data Sheet

Project: MDOT Gorham By Pass
Date: 12-5-02 pg.

Receptor: 21 ~~South~~ Main St. ~~Fort Hill Rd~~ (Rte. ~~114~~ 25) - Intersection
Technician(s): TDH / BTS

Measurement Results:

Leq: 67.0 *
L10: ____

Start: 16:00
delT: 20 min
Stop: 16:20

Lmax: ~~57.0~~ 83.5
L90: ____

Lmin: 53.6
Events: ____

SLM Equipment: LD 820
Pre Calibration: 113.9 (114.0)

Met. Conditions: WS: ≤ 5 mph T°F: 35 Sky: cloudy

Notes/Observed Noise Sources: - IDLING traffic ≈ 60-63 dB

very HVY traffic (mostly cars) along all four approaches to Gorham Center!

*NO traffic counts along Rte. 114 to South St.

CARS	HT	MT
240	1111	111

APP SPD ≈ 25-30 mph
DEP SPD ≈ 35-45 mph

* after Δt=7 min, police car w/ siren came screeching through!
* TDH stopped SLM for 25 sec!

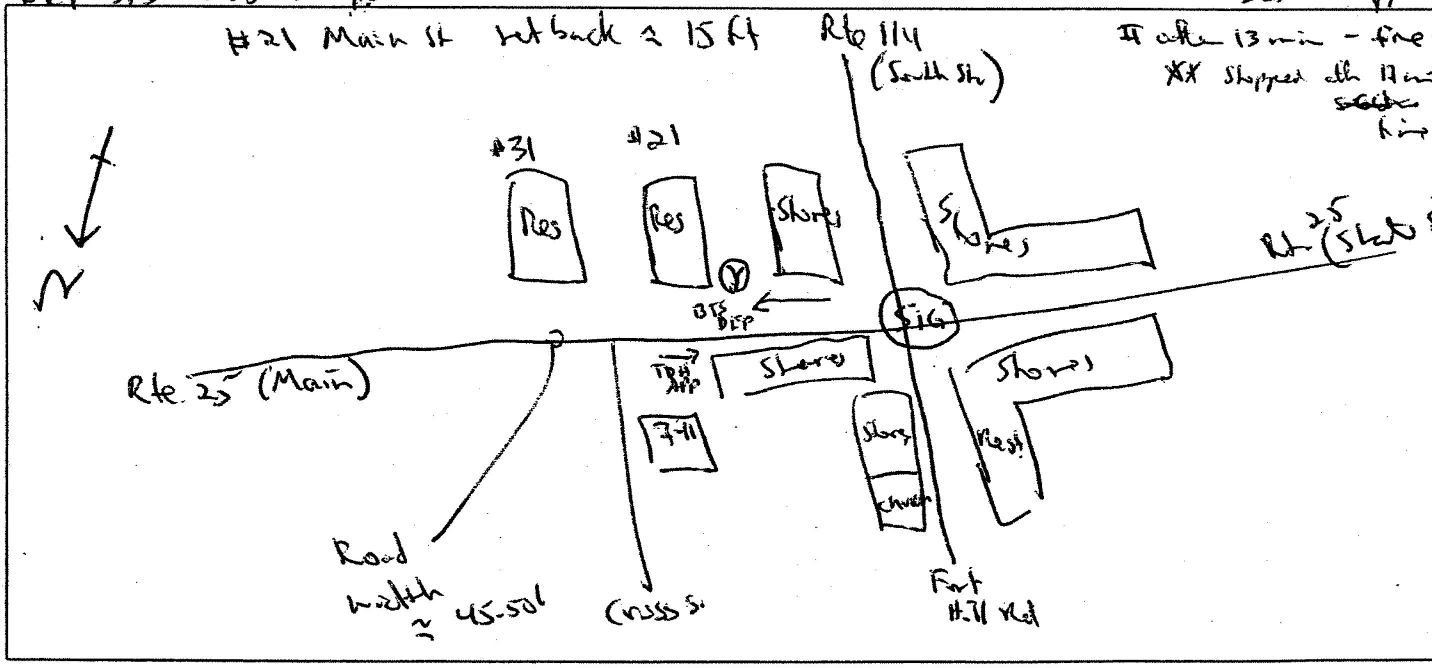
~~TDH~~ BTS ← EB DEP ~~DIR~~

TDH ~~BTS~~ WB → APP DIR

Rte 25		
EB	CARS	186 x 3
	MT	7 x 3
	HT	10 x 3
	BUS	–
WB	CARS	240 x 3
	MT	3 x 3
	HT	4 x 3
	BUS	

† after 10 min - ... SLM stopped ...
# after 13 min - fire ...
** stopped ... 17 min ...

Site Sketch



(7) - AMB

Noise Measurement Data Sheet

Project: Gorham Bypass Date: 12-4-02 pg.

Receptor: 20 Adeline Dr. Technician(s): TPH / BTS

Measurement Results:

Leq: 35.9 L10: 38.7

Start: 12:02 Lmax: 54.9 L90: 30.3

delT: 20 min

Stop: 12:22 Lmin: 27.9 Events:

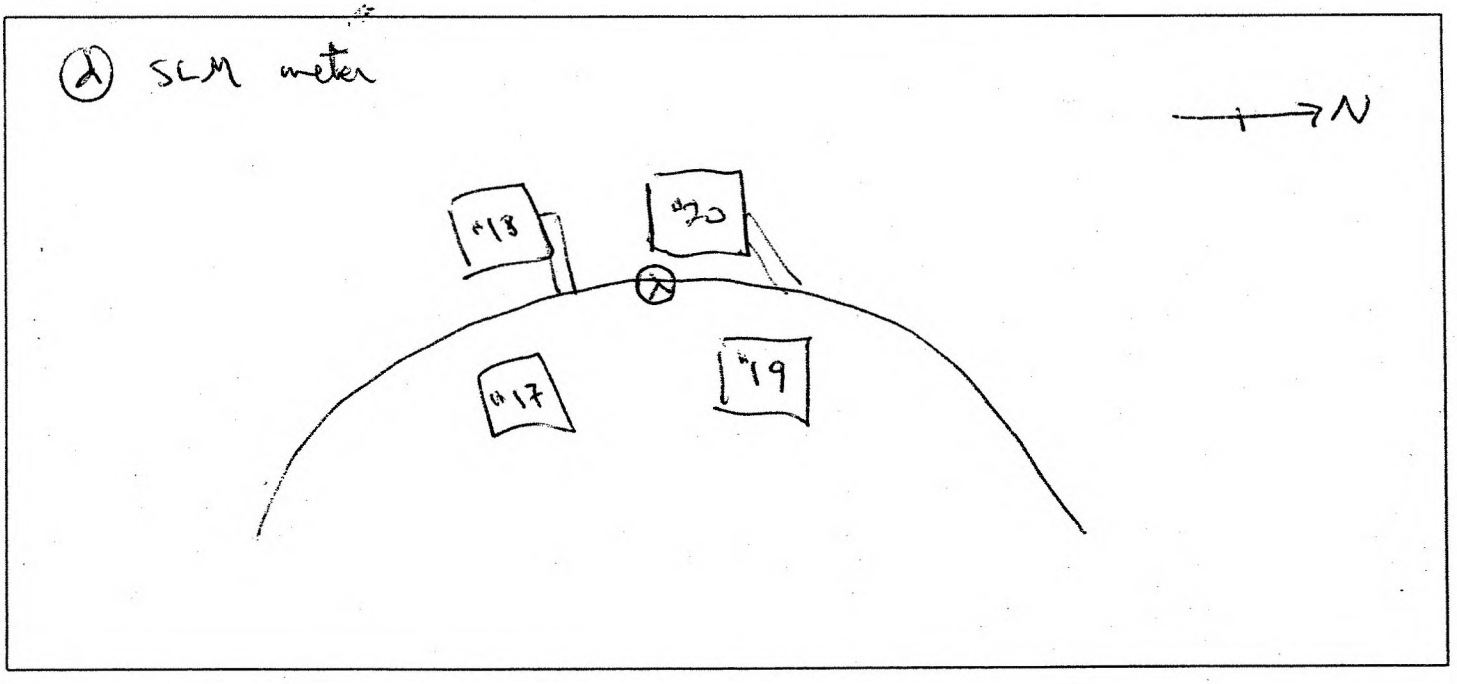
SLM Equipment: LD 820 Calibration: 114.0 (114.0)

Met. Conditions: WS: calm T°F: 245 Sky: clear blue

Notes/Observed Noise Sources:

- distant traffic along 202? very faint → upto 40dB
- BKGD = 33-34 dB - very few leaves rustling - very calm & quiet condition
- no local street traffic, birds or other environ. sounds
- AMB 820 :- NO traffic cond!
- Photo # 27,28

Site Sketch



(8) AMB

Noise Measurement Data Sheet

Project: MDOT Gorham By Pass Date: 12/5/00 pg.

Receptor: #80 Waterhouse Rd Technician(s): BTS, TDH

Measurement Results:

Leq: 42.0 L10: 45.4

Start: 10:00 delT: 20 min Lmax: 58.3 L90: 33.9

Stop: 11:20 Lmin: 31.3 Events:

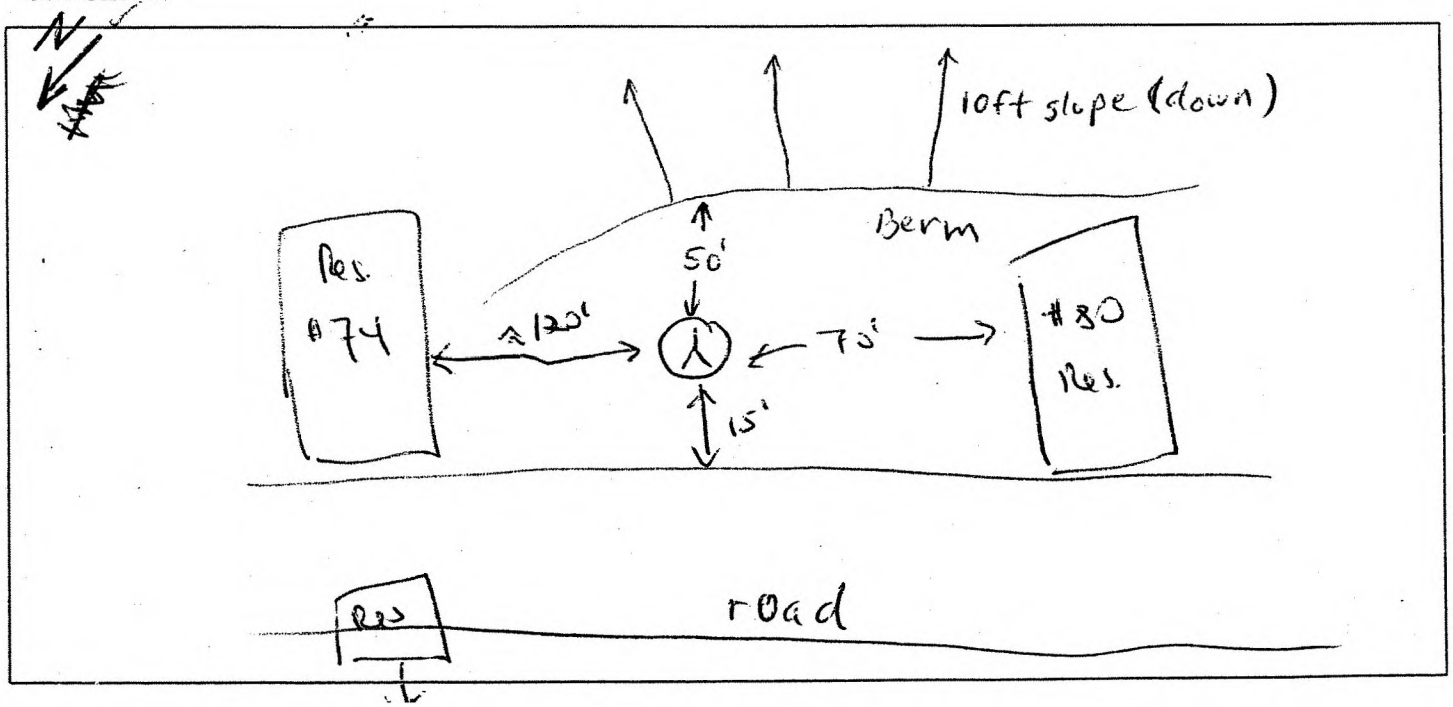
SLM Equipment: LD820 Calibration: 112.6 (114.0) from Prev.

Met. Conditions: WS: ≈2-3 ~~4~~ mph T°F: 30° ✓ Sky: Sunny w/ some clouds ✓

Notes/Observed Noise Sources:

- BKGD - 35 dB ✓
- No traffic during Waterhouse Rd - distant traffic during RR
- leaves rustling - breezy
- no birds or other wildlife noticeable -

Site Sketch



(9) - AMB

Noise Measurement Data Sheet

Project: MDOT Gorham Bypass Date: 12/5/02 pg.

Receptor: Meadow Crossing Dr #11 Technician(s): BTS, TDH

Measurement Results: Leq: 43.3 L10: 44.8

Start: 10:20 delT: 20 min Lmax: 58.0 L90: 40.2

Stop: 10:40 Lmin: 37.3 Events: _____

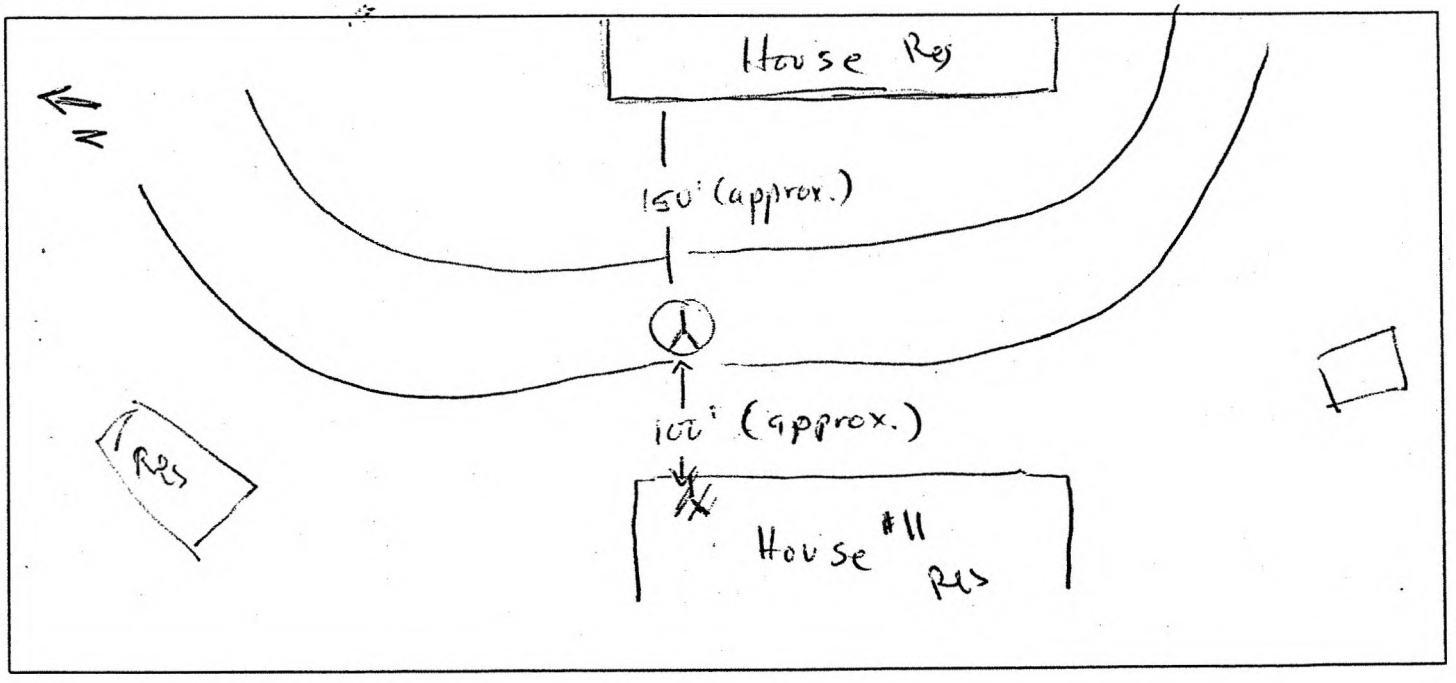
SLM Equipment: LD 820 Calibration: 112.7 (114.0)

Met. Conditions: WS: calm T°F: 30 Sky: Sunny w/ some clouds

Notes/Observed Noise Sources:

- photo 25 + 24
- ~~bkgd~~ BKGD - 43.6
- truck in distance + distant traffic - 47.6
- leaves rustling - 48 (approx.) no traffic locally
- max is due to Lexus at #11 left driveway

Site Sketch



(10) AM B

Noise Measurement Data Sheet

Project: MDT Gorham Bypass Date: 12/5/00 pg.

Receptor: #28 Day Rd. Technician(s): BTS, TOH

Measurement Results: Leq: 46.2 L10: 48.0

Start: 11:30 Lmax: 63.7 L90: 38.1

Stop: 11:50 delT: 20 min Lmin: 34.2 Events: _____

SLM Equipment: LD 820 End Calibration: 112.6 (114.0)

Met. Conditions: WS: 0-5mph T°F: 37 Sky: Sunny w/ few cloud

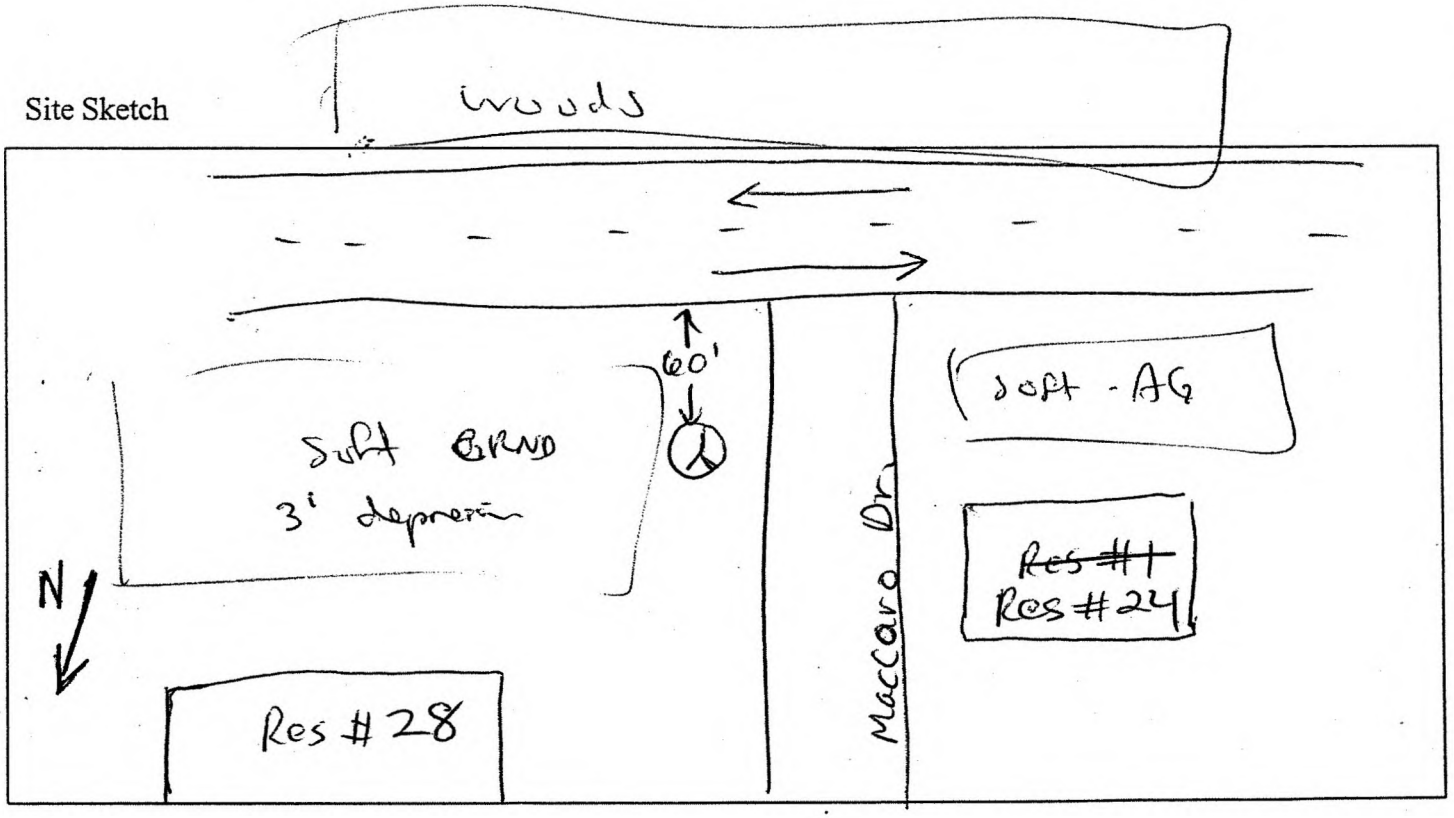
Notes/Observed Noise Sources:

- BKGD - 37.1
passing car - 62.
- pictures - 23, 22

Cars
111

Avg Speed ~ 25-30 mph

Site Sketch



APPENDIX B

Gorham Bypass 66 dBA Noise Contours for Bypass Alternatives

1. Alternative 1c

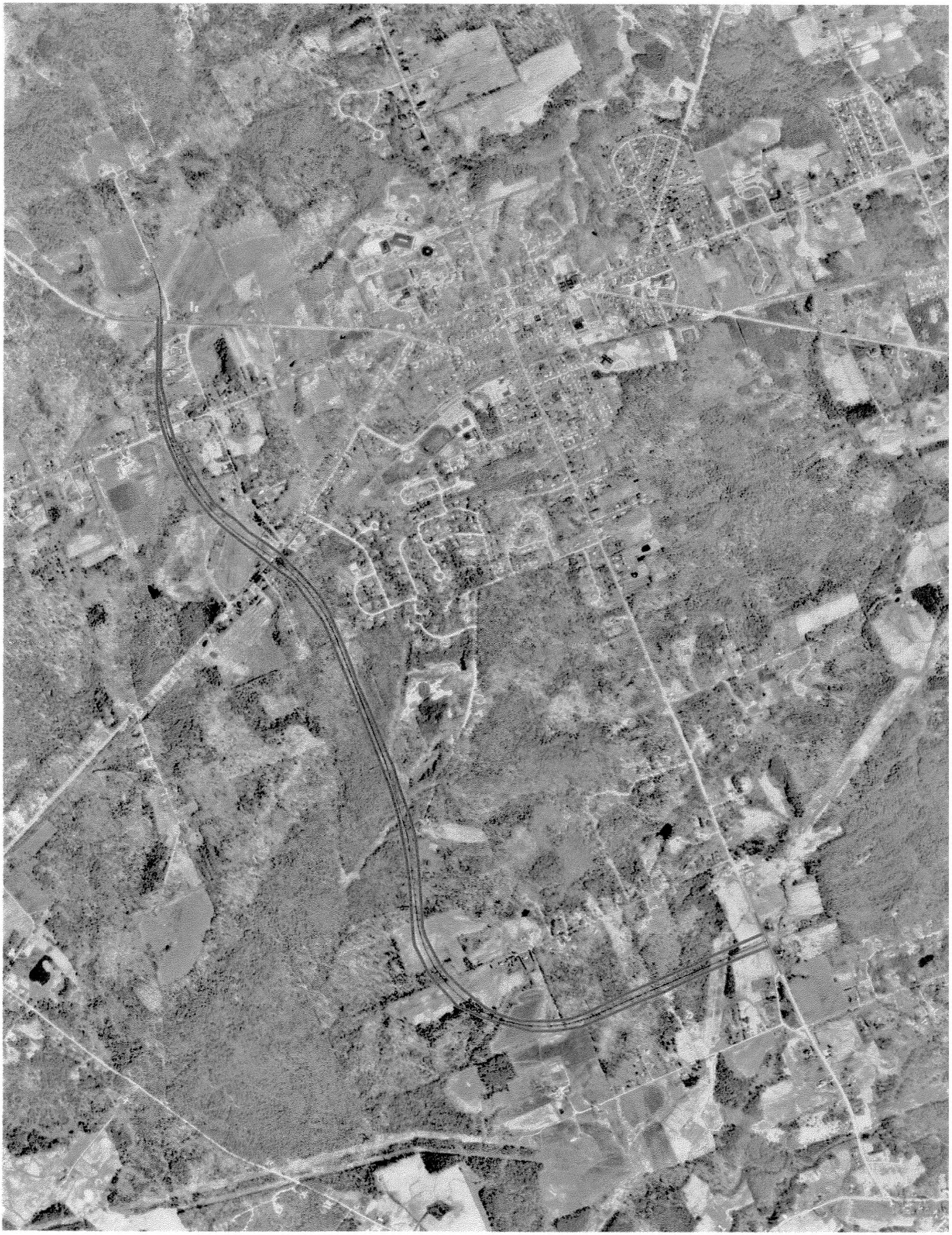
2. Alternative 1e

3. Alternative 6b

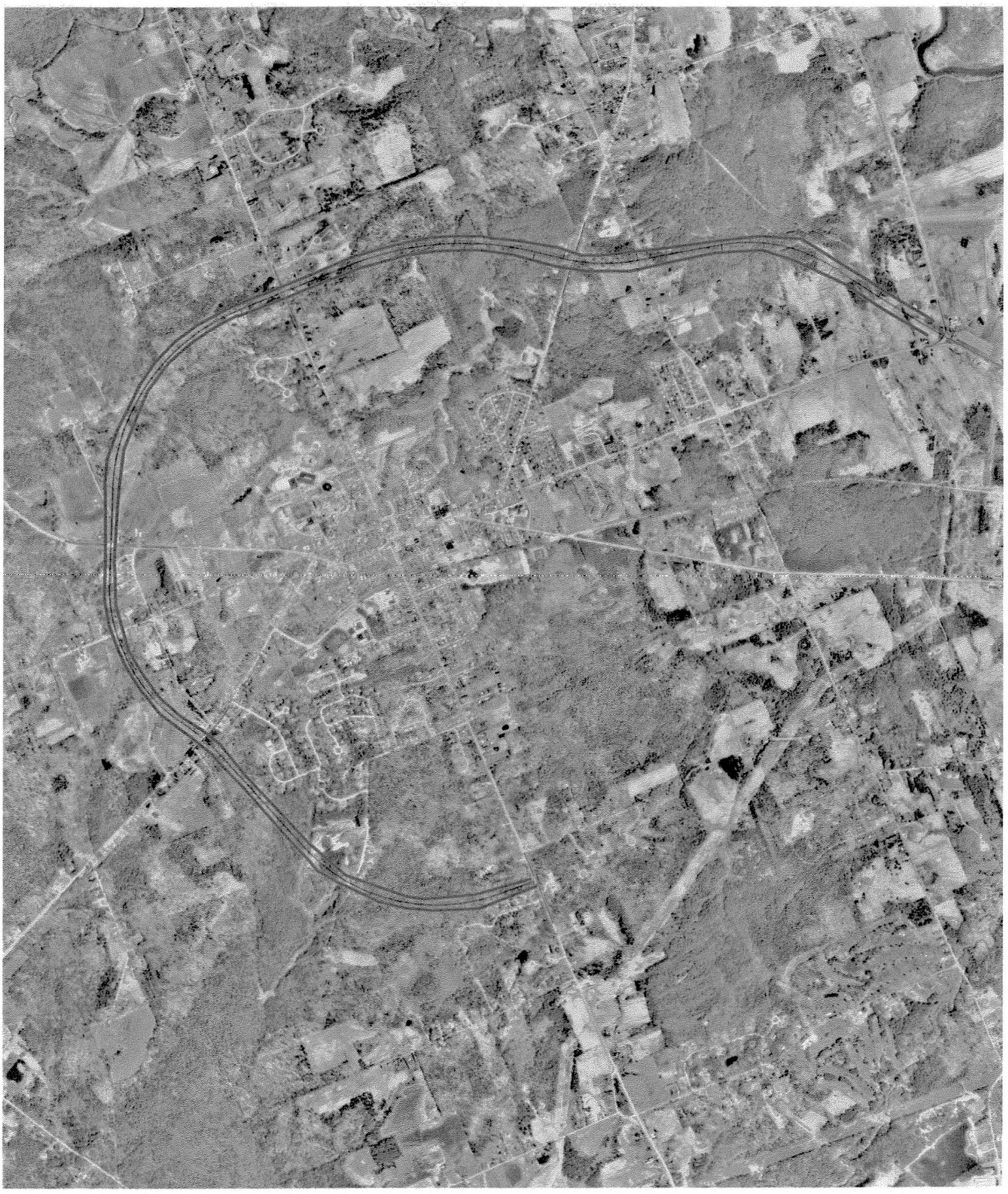
4. Alternative 6c

Note: Noise contours for Alternative 6d are a combination of the northerly bypass segment of Alternative 6c and Alternative 1e.

1)



2)



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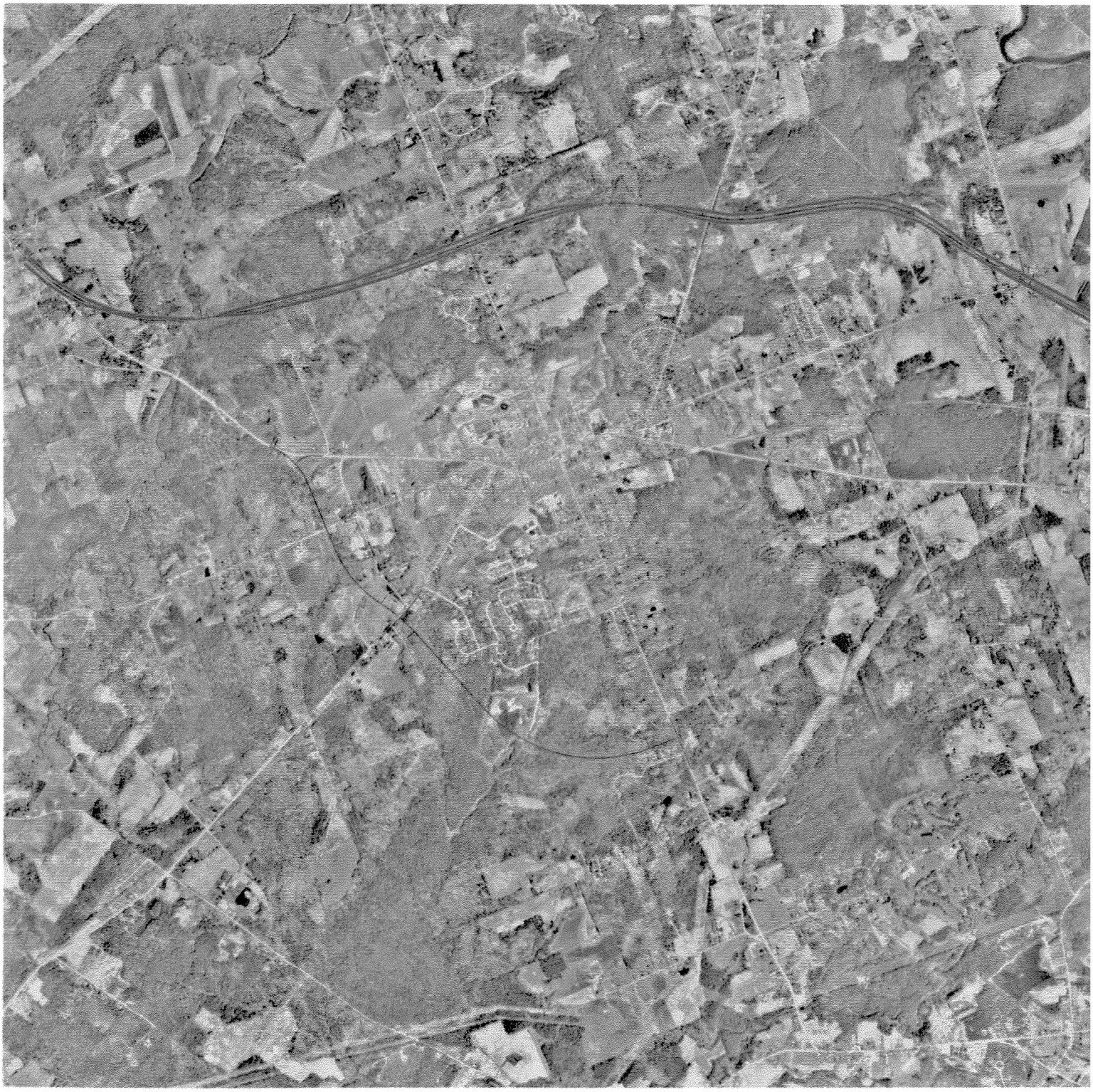

4)

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