Village of Forest Park
Memorandum

TO: Planning and Zoning Commission

FROM: Steve Glinke, Director- Building, Planning, and Zoning

SUBJECT: PZC 2024-04**:** 711 Des Plaines Avenue
Property Owner: CTA Petitioner: Outfront Media

DATE OF REPORT: 15 MAY 2024

DATE OF PZC MEETING: 20 MAY 2024

PROJECT OVERVIEW: The petitioner is requesting the approval of a conditional use permit to allow the installation of a single-faced digital LED billboard structure.

BACKGROUND: On April 15th, 2024, the Planning and Zoning Commission (PZC) heard the case for a new billboard on the subject property, 711 Des Plaines Avenue. The PZC determined more information was needed, including the following:

1. Sign orientation
2. Pole location
3. Engineering drawings
4. Topography
5. Lumen study
6. Size of land that billboard takes up (including overhang)
7. Height of billboard (also height relative to the neighborhood)
8. Understanding of the choice for this location on the site

The applicant has reduced the overall height of the billboard to 75' and is proposing a one-sided billboard (instead of two).

GENERAL PROPERTY INFORMATION

Applicant's Name: Stina Fish
Property Owner's Name: CTA
Common Property Address: 711 Des Plaines Ave.
Common Location: North of I-290 and South of Van Buren St.
Neighboring Property Land Use(s): North – CTA Des Plaines Station
South – Expressway
West – CTA Railyard
East – Des Plaines Ave,

Comprehensive Plan Designation: Community Facilities / Institutional
Existing Use of Property: CTA Railyard
Proposed Use of Property: CTA Railyard with a single-faced digital LED billboard
Existing Property Zoning: I-2 Limited Industrial
Property Size: 2.89 acres

Direction	Zoning	Jurisdiction	Existing Land Use
North	I2	Forest Park	CTA Station
South	Not zoned	IDOT	290 Expressway
East	Not zoned	Forest Park	Des Plaines Ave
West	I2	Forest Park	CTA Railyard

PROJECT DOCUMENTS:

The following documents, submitted by the applicant, are attached to this report as Exhibit 1.

1. CTAConditionalUseAppEast.pdf (38 pages, dated 02-28-2024)
2. CTAConditionalUseAppEastMaps.pdf (5 pages, dated 01-17-2024)

3. FPCTAConditionalUseApp051524 (11 pages, dated 02-28-2024)
4. Sign Elevation.pdf (1 page, dated 05-10-2024)
5. Forest Park Site with Sign 20x60 FF SF.pdf (1 page, dated 05-10-2024)
6. InsidetheWachtel2009DigitalDisplayReport.pdf (48 pages, dated 2010)
7. PA congressional letter June 2010.pdf (1 page, dated 06-29-2024)
8. Community Testimonials.pdf (1 page, no date)
9. Chicago 20 x 60 sf 75 tall.pdf (5 pages, dated 05-10-2024)

PROJECT DESCRIPTION:

The applicant is requesting approval of a conditional use permit to allow the installation of a single-faced billboard structure. This billboard structure is proposed to be located on the Southeast corner of the property along Des Plaines Ave. The billboard is set to face Southwest (toward the expressway).

STAFF REVIEW:

Billboards are a conditional use in the Zoning Ordinance. Advertising along interstates falls under the jurisdiction of the Illinois Department of Transportation; however, all such signs must also comply with local ordinances. Article D of the Zoning Ordinance specifically addresses “Signs Regulated Under The Highway Advertising Control Act Of 1971” and specifies Village requirements above and beyond that.

STANDARDS FOR CONDITIONAL USE:
In reviewing and determining whether to approve or disapprove a conditional use permit, the Zoning and Planning Commission and Village Council shall consider the criteria established in 9-10-7 of the Village of Forest Park Zoning Code. The criteria and staff’s evaluation of the applications compliance with those criteria are as follows:

1. That the establishment, maintenance, or operation of the conditional use will not be detrimental to, or endanger the public health, safety, morals, comfort, or general welfare;
2. That the conditional use will not be injurious to the use and enjoyment of other property in the immediate vicinity for the purposes already permitted, nor substantially diminish and impair property values within the neighborhood;
3. That the establishment of the conditional use will not impede the normal and orderly development and improvement of the surrounding property for uses permitted in the district;
4. Those adequate utilities, access roads, drainage and/or necessary facilities have been or are being provided;
5. That adequate measures have been or will be taken to provide ingress and egress so designed as to minimize traffic congestion in the public streets;
6. That the proposed conditional use is not contrary to the objectives of the current comprehensive plan for the village of Forest Park; and

7. That the conditional use shall, in all other respects, conform to the applicable regulations of the district in which it is located, except as such regulations may, in each instance, be modified pursuant to the recommendations of the board.

CONDITIONAL USE FINDINGS OF FACT:

1. The proposed sign has been revised to face only the expressway and is regulated by the Illinois Department of Transportation.
2. The one-sided sign will be entirely contained on the subject property and will not interfere with the use or enjoyment of the surrounding properties.
3. The proposed sign is located on an industrial property. The digital LED face will be dimmed at night per Illinois Department of Transportation standards.
4. The proposed sign will rely on electric services that are already provided to the site and will not require any additional services.
5. The proposed sign will be limited to the subject property and will not impact traffic congestion on local streets.
6. The proposed use will not change the use allowances or established character of the subject property.
7. The proposed sign will comply with all applicable regulations of the underlying I-2 district.

Based on the submitted petition and testimony provided, I move that the Planning and Zoning Commission recommend to the Village Council approval of the request for a conditional use permit subject to the following conditions:

1. ***The site shall be constructed in substantial compliance with the "Project Documents" identified in this report and available in the Department of Public Health and Safety.***
2. ***All construction shall comply with the Building Code of the Village of Forest Park, with final plans subject to review and approval by the Village Engineer and Director of Public Health and Safety.***
3. ***No building permits and no Certificate of Occupancy for the Subject Property shall be issued by the Department of Public Health and Safety to the Owner unless all debts owed to the Village of Forest Park by the Owner have been paid in full prior to the issuance of such permits or certificate.***
4. ***Any violation of the above conditions will result in a violation of the Municipal code of the Village of Forest Park and the owner may be subject to fines for each day said violation exists.***

Exhibits for PZC 2024-04 Conditional Use request for a billboard. Meeting continued from 15 April 2024.

1. Portioner's attorney correspondence dated 16 May 2024
2. FHA correspondence dated 29 June 2010
3. Community testimonials
4. Photos for petitioner presentation (5)
5. Sign location aerial
6. Sign elevation
7. Light dispersion for petitioner presentation (5)
8. Inside the Wachtel 2009 digital display report

LAW OFFICES OF
SAMUEL V. P. BANKS

SAMUEL V.P. BANKS D. 3-6-2010
JAMES J. BANKS

NICHOLAS J. FTIKAS
SARA K. BARNES
ASHLEY R. FAKHOURI
MARK G. VANECKO - OF COUNSEL

THIRTY-EIGHTH FLOOR
221 NORTH LASALLE STREET
CHICAGO, ILLINOIS 60601
PHONE (312) STATE 2-1983
FAX (312) 782-2433

May 16, 2024

Sent via Email ONLY
Mr. Steve Glinke
Director, Building Planning and Zoning
Village of Forest Park
Email: sglinke@forestpark.net

Re: 711 Des Plaines, Forest Park, IL
Variation for Advertising Signage

Dear Steve,

Based on concerns raised by some Forest Park residents during the more recent Planning and Zoning Commission meeting concerning the above-referenced matter, the Chicago Transit Authority ("CTA") has modified the proposed advertising sign by reducing the overall height of the sign from 120 ft. to 75 ft. The CTA has also agreed to install a single face digital display sign facing west. The east-facing sign face, which would have faced toward the nearest residential area, has been removed.

On Monday, May 13, 2024, the CTA used a bucket truck on site to demonstrate the visibility of the proposed sign from Lathrop Street. The bucket truck was measured at 75 ft. in height. Photos were taken from various points on Lathrop Street to ensure not even the backside of the proposed sign structure would be visible to residents in that area. Copies of the photos taken are attached for your review and file.

Please feel free to contact me at (312) 782-1983 should you wish to further discuss this matter.

Sincerely,

Nicholas Ftikas
Law Offices of Sam Banks

Attachments (photos).

Congress of the United States

Washington, DC 20515

June 29, 2010

Mr. Victor Mendez
Administrator
Federal Highway Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Administrator Mendez:

Sharing your interest in safety, we are writing to bring to your attention our concerns about a pending traffic-safety research project sponsored by Federal Highway Administration.

As background, FHWA published a research plan in February 2009 that outlined a multi-stage project to study traffic safety and digital billboards (commercial electronic variable message signs). Stage 1 is underway, using an instrumented vehicle in test areas to study driver behavior.

The team assembled by FHWA, and its contractor Science Applications International Corporation (SAIC), includes Jerry Wachtel of Berkeley, CA, a psychologist certified by the Board of Certification in Professional Ergonomics. In published remarks made at a local zoning hearing held on April 26 in Pennsylvania, Mr. Wachtel said: "Off-premise signs, however, serve no purpose and have no compensatory benefit." His written report submitted to townships in Pennsylvania implies that the goal of the outdoor advertising industry is to harm public health and safety.

> *It must be remembered and understood that the objective of public officials and the traffic safety experts in their employ is first and foremost to protect the public health and safety in their jurisdictions. Conversely, the objective of billboard companies is quite the opposite."*

To be clear, the focus of our concern is not local zoning. We are concerned that these types of harsh statements may undermine the credibility of on-going federal research, which should be impartial. In your response, please provide us with your assurance that pending federal research is without bias.

Sincerely,

Tim Holden

Todd Russell Platts

Charles W. Dent

Christopher P. Carney

Jason Altmire

COMMUNITY TESTIMONIALS

ALBUQUERQUE, NM

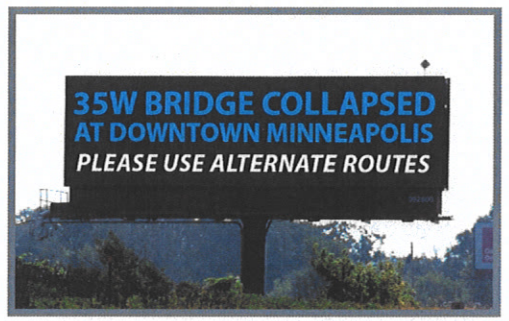
Albuquerque Planning Director Richard Dineen, AIA: "The copy and image quality is very sharp and completely legible during the day without having undue brightness at night."

CLEVELAND, OH

Joe Cimperman, Cleveland City Councilman describes digital billboards as modern and tech-savvy: "Digital billboards are right in line with the whole cityscape. They communicate that we are a city that embraces technology. We actually have some of the newest state-of-the-art cutting edge advertising."

MINNEAPOLIS, MN

US Senator Amy Klobuchar, D-MN, explains the quick response to post emergency messages on digital billboards after a major bridge collapsed in Minneapolis in 2007: "When Senator Coleman and I landed, we're driving in . . . and there were already billboards at 9:00 in the morning -- actual billboards -- telling people where to go for alternative routes."



ROCHESTER, MN

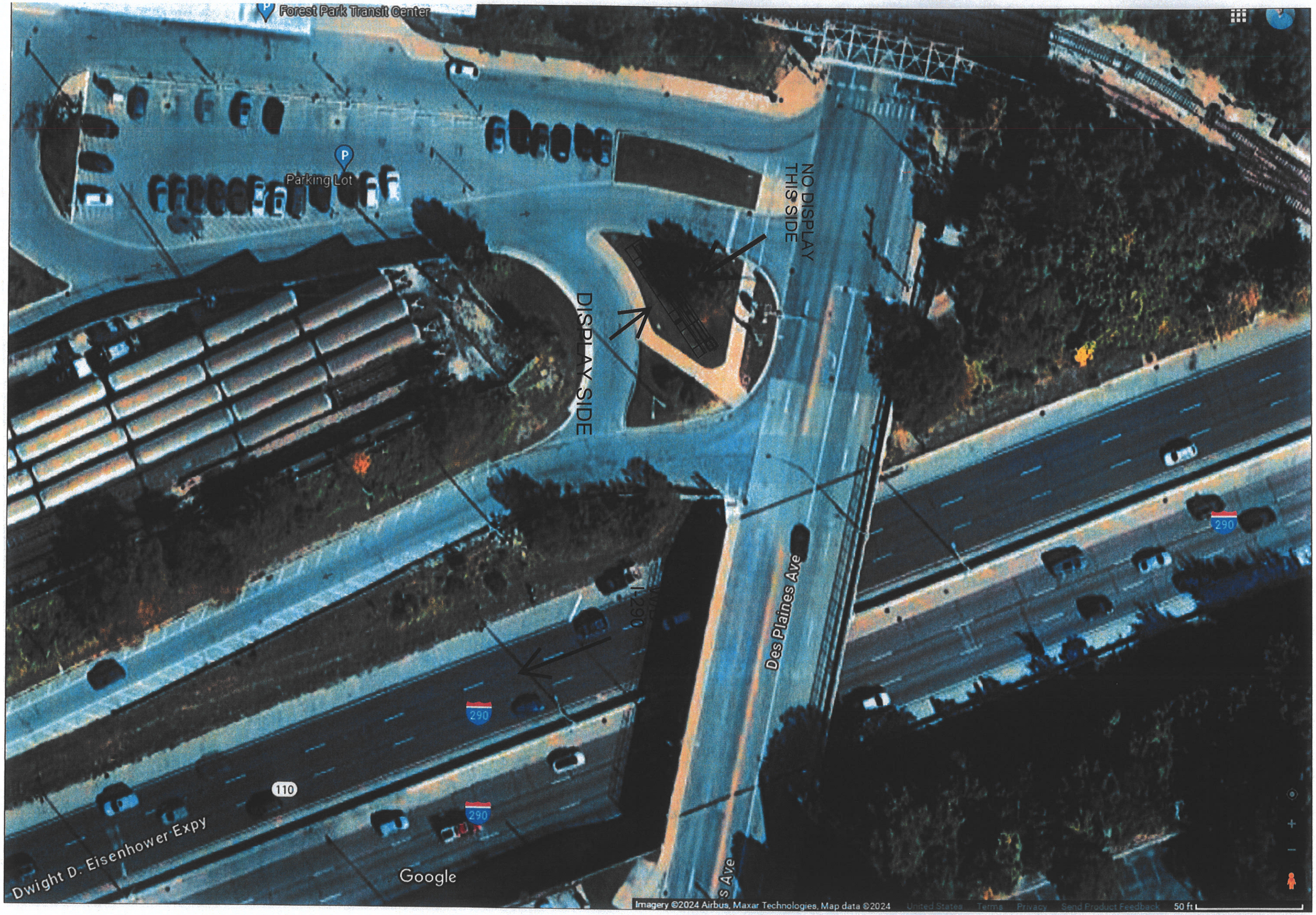
Rochester (MN) City Council President Dennis L. Hanson: "Dynamic digital billboards enhance our city."

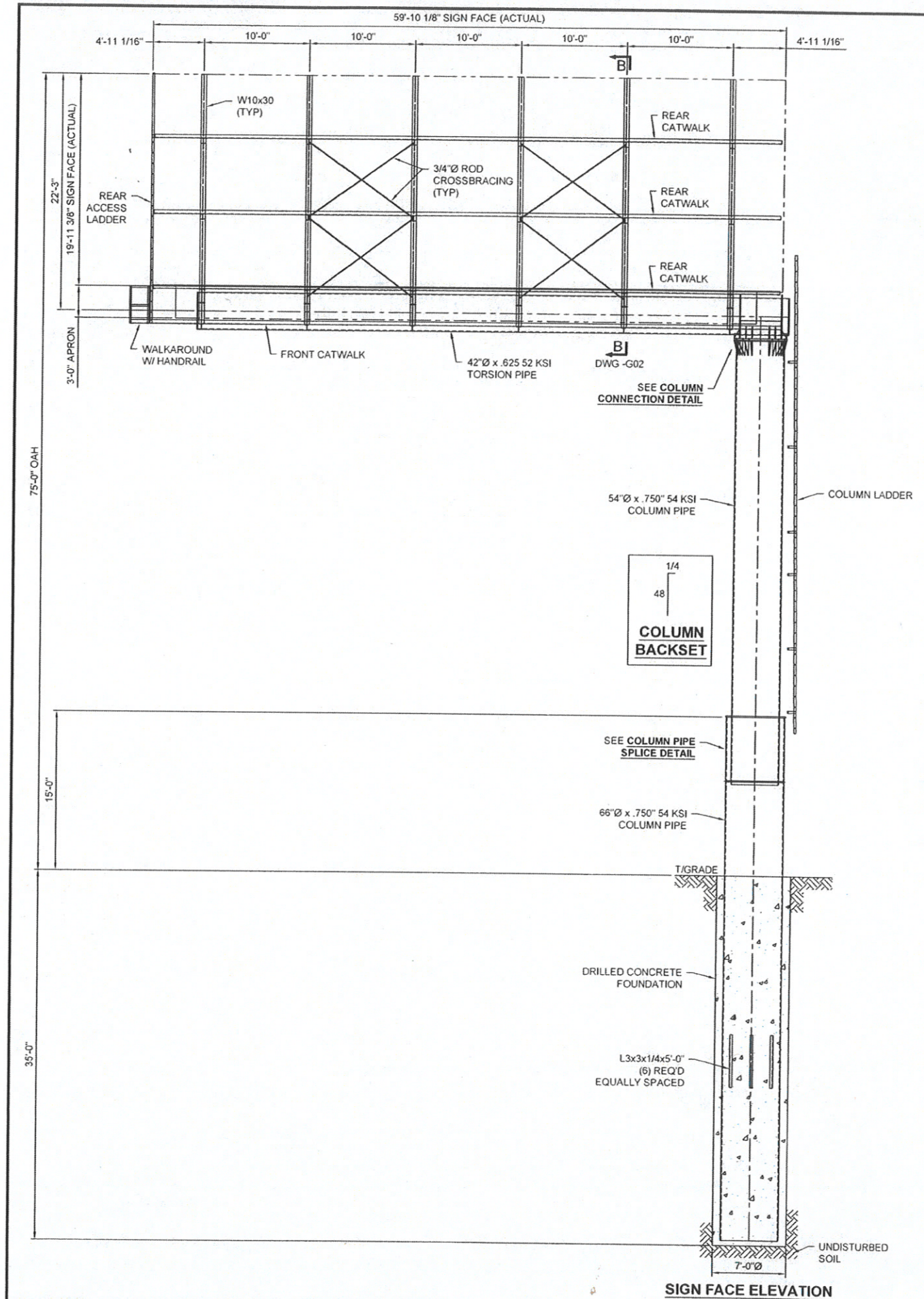
AMERICA'S MOST WANTED

John Walsh, founder of America's Most Wanted, praises digital billboards: "High-tech billboards are the latest way to reach the public."

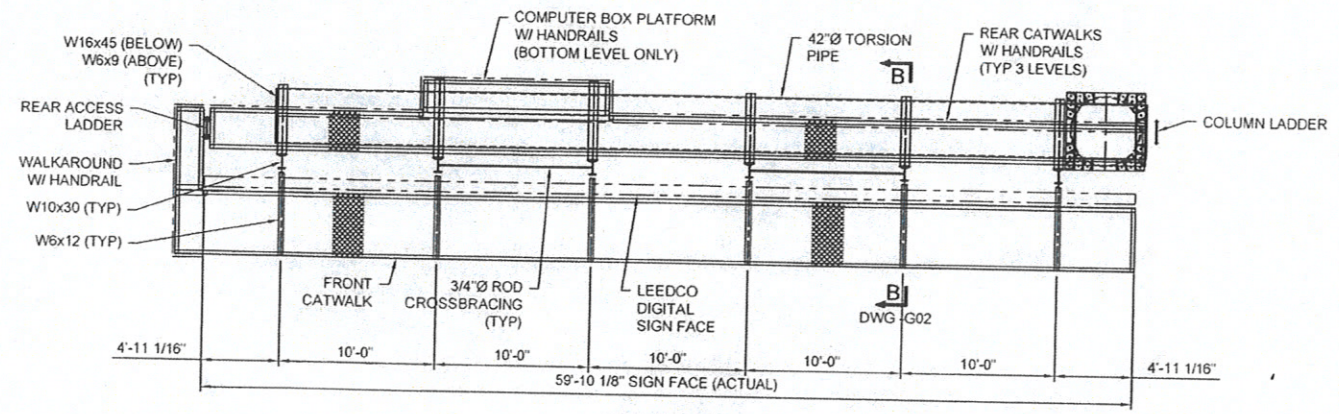
OUTDOOR ADVERTISING ASSOCIATION OF AMERICA, INC.


PARKING ONLY

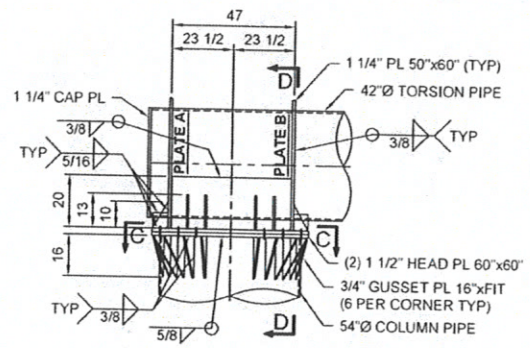

Forest Park Transit Center
Parking Lot
NO DISPLAY THIS SIDE
DISPLAY SIDE
Des Plaines Ave
290
110
Dwight D. Eisenhower Expy
Google
Imagery ©2024 Airbus, Maxar Technologies, Map data ©2024
United States
Terms
Privacy
Send Product Feedback
50 ft



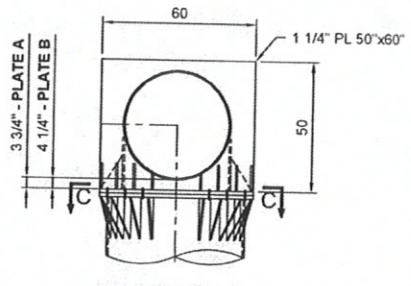
SIGN FACE ELEVATION



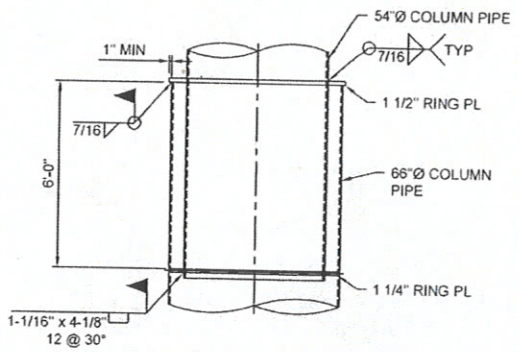
PLAN VIEW



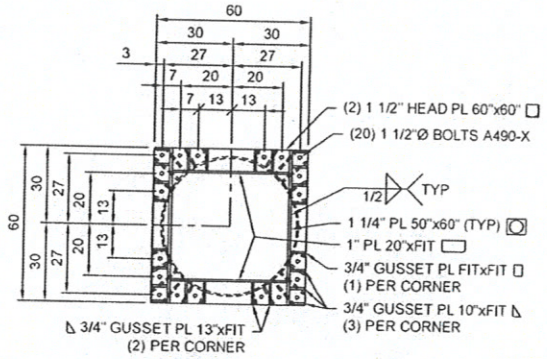
COLUMN CONNECTION DETAIL
SCALED X2



SECTION D-D
SCALED X2



COLUMN PIPE SPLICE DETAIL
SCALED X2



SECTION C-C
SCALED X2

PRELIMINARY

NOT FOR CONSTRUCTION

ALL STEEL STRUCTURES, INC.

16301 S. Vincennes- South Holland, IL 60473-2017
1-800-621-1759

Job No. Prelim. Date: 05/10/24

20'-0" x 60'-0"
FF, SF, 75' OAH

GENERAL ARRANGEMENT
ENGINEERING DWG. #. NA

REVISION 0 - 05/10/24

DRAWING No 20x60.FF.SF.Pre-G01

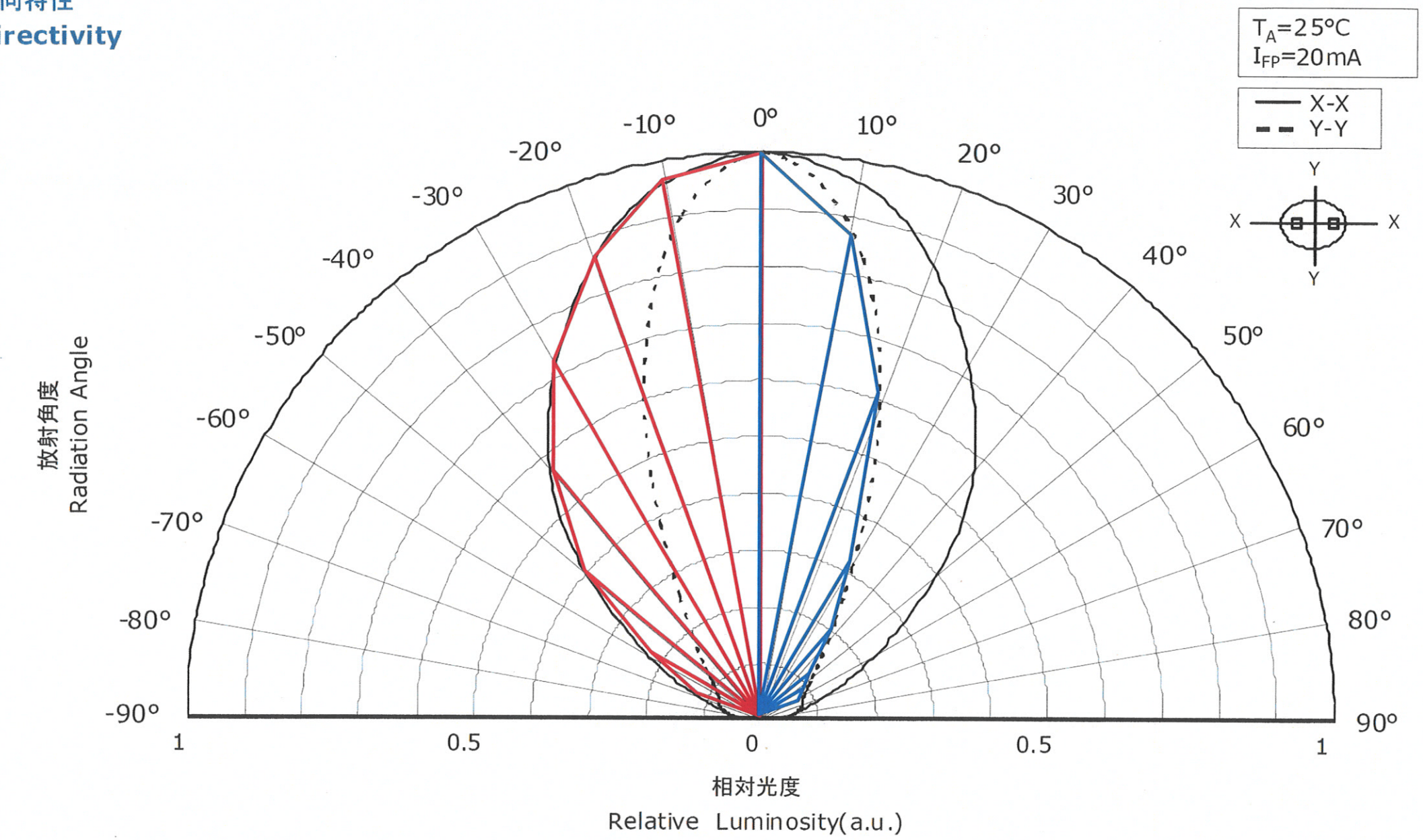
CUSTOMER OUTFRONT MEDIA

LOCATION 711 DES PLAINES AVE.
FOREST PARK, IL

ENG. NA CAD MR

DATE NA

指向特性
Directivity

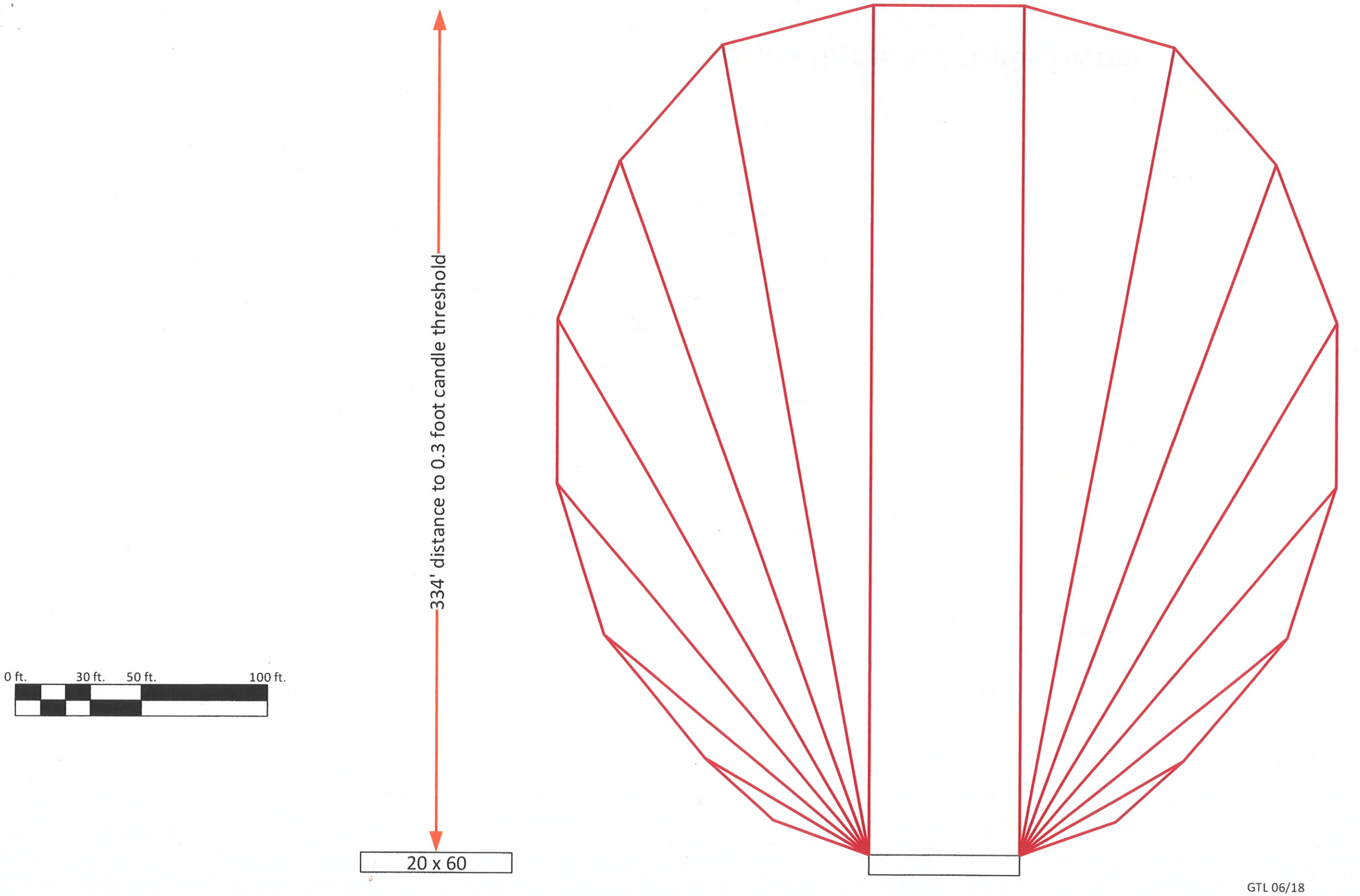


Nichia NSPX336 FOV 90 degree horizontal
45 degree vertical diodes with narrow light broadcast dispersion.

Horizontal dispersion mapped in red

Vertical dispersion mapped in blue

20 x 60 Horizontal Dispersion (Plan View)



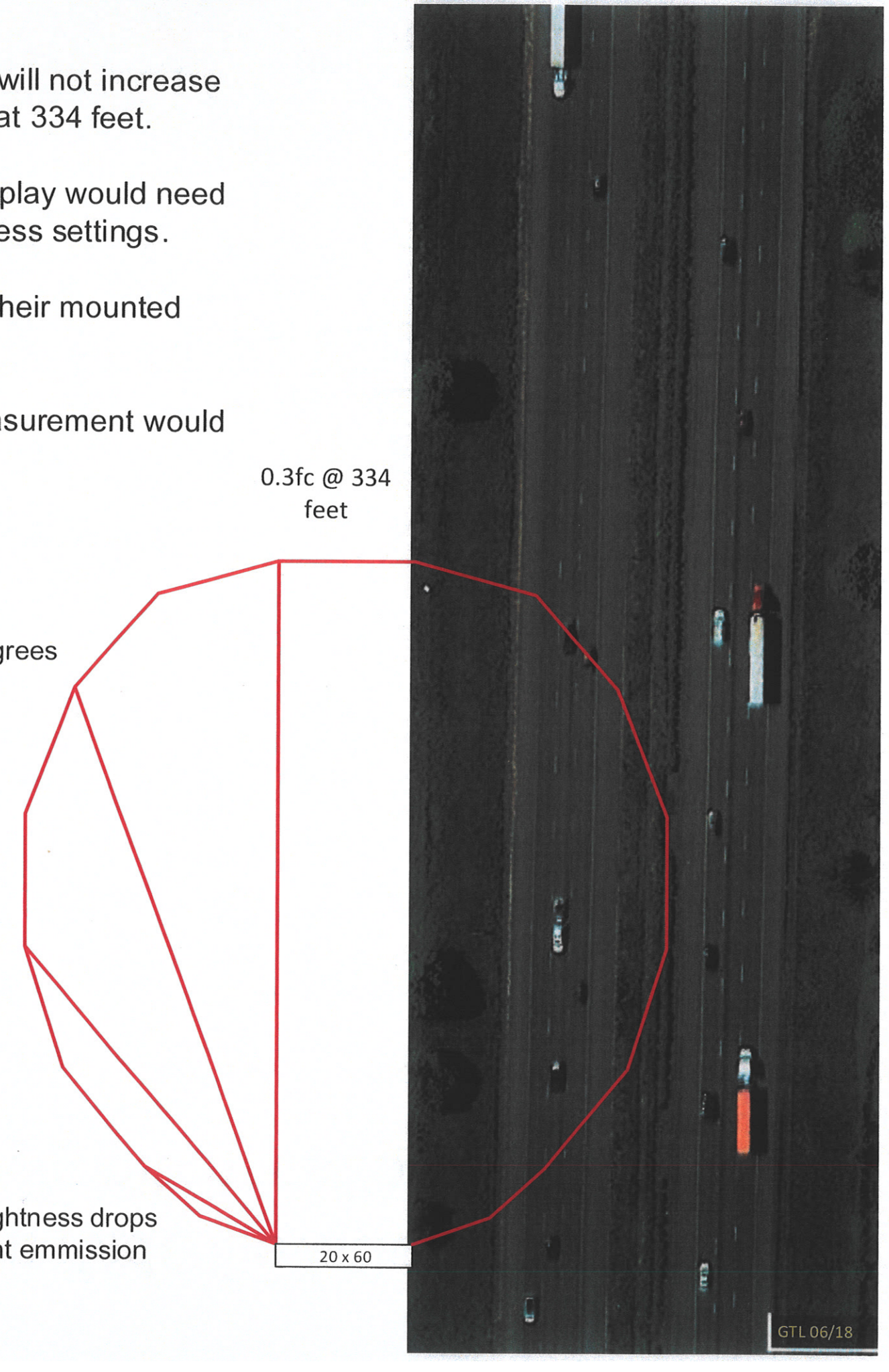
GTL 06/18

Per OAAA Lighting Guidelines, a 20 x 60 digital display will not increase the ambient lighting by more than 0.3 foot candles at 334 feet.

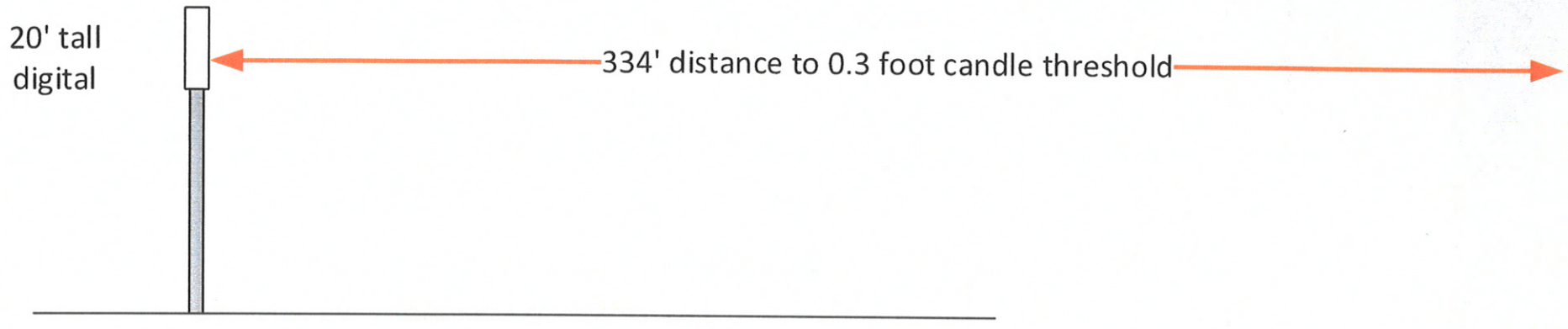
In order to increase the ambient light the full .3fc, the display would need to emit a full white frame (copy) at night time brightness settings.

The LEDs are most intense directly perpendicular to their mounted position

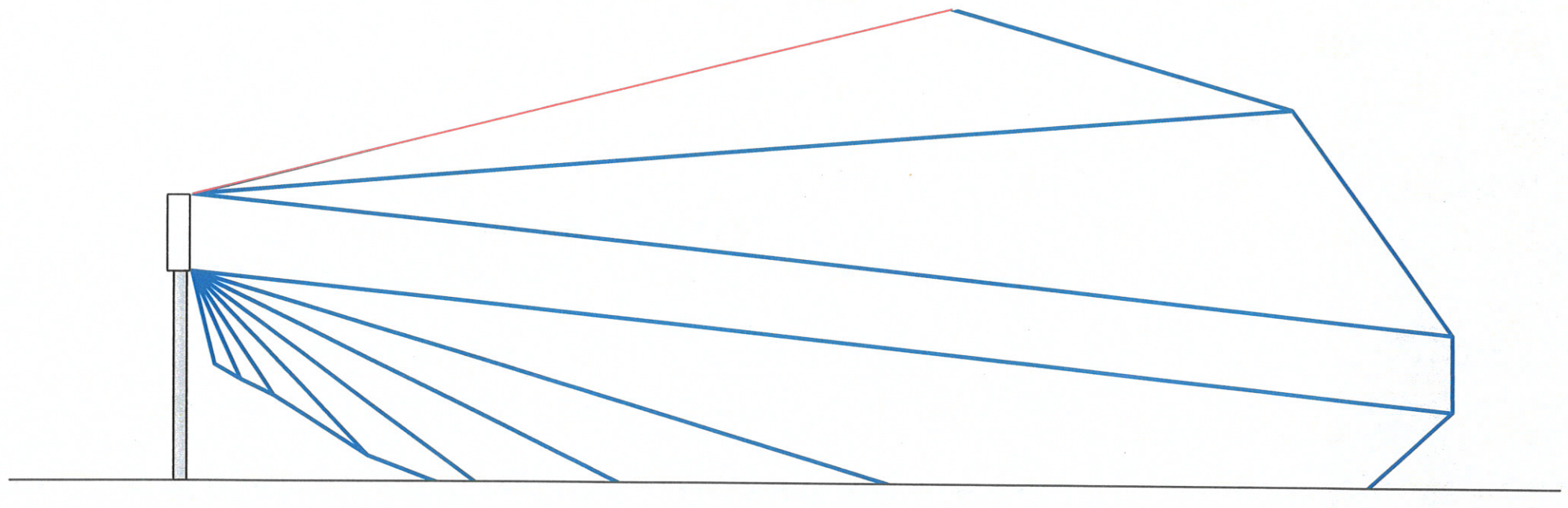
The RED boundary shows the distance that the .3fc measurement would be obtained with full white copy.



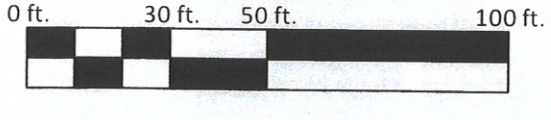
20 x 60 Vertical Dispersion (Side Elevation View)
Updated to show down pitched diodes



14 degree above perpendicular to face limit



In this drawing the display is 75' above grade



GTL 06/18
Rev 08/18


Earth

Inside the Wachtel 2009 Digital Display Report:
A Commonsense Guide

Version 4.7.10

Prepared by
Richard B. Crawford, Esquire
Mercer Sign Consultants

For the United States Sign Council
211 Radcliffe Street
Bristol PA 19007

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Inside the Wachtel 2009 Digital Display Report: A Commonsense Guide

Executive Summary

The purpose of this Guide is to examine the 2009 National Cooperative Highway Research Program (NCHRP) Report on Outdoor Advertising Signs that use Digital Display technology, and matters directly related to this report. The new NCHRP report was issued in April 2009 titled *Safety Impacts of the Emerging Digital Display Technology for Outdoor Advertising Signs* and was authored by Jerry Wachtel, a human factors researcher based in Berkeley CA. The Wachtel report was funded by the National Cooperative Highway Research Program (NCHRP); NCHRP is administered by the Transportation Research Board (TRB).

In this review, the terms Digital Billboard (DBB) and Electronic Message Center (EMC) will be used jointly, inter-changeably, and at times separately.

At the outset, it is important to note that the NCHRP's *Safety Impacts of the Emerging Digital Display Technology for Outdoor Advertising Signs* does not prove or demonstrate that Outdoor Advertising Signs with Electronic displays (DBB or EMCs or CEVMS) cause traffic accidents or create so much Driver inattention that there are crashes. Many have claimed this since the Wachtel Report's publication. The Wachtel Report spends 194+ pages to say very little if anything new. What the report does is advance a theory that Drivers at times glance at Electronic Billboards for longer periods of time, thereby creating driver inattention or so-called "distraction"; and that this inattention, based on the glances at the Digital Billboards (DBB), causes accidents.

End result of this new theory on Electronic signs? More controversy, just when a more fact-based approach would be beneficial to all concerned. Already critics are breathlessly labeling Digital Billboards and EMCs as "Power Points in the sky" and "Television on a stick" (a variation on the old chestnut "litter on a stick" when referring to signs).

It is well-known that Billboards and Electronic signs have both detractors and supporters. Yet never before has a scientific theory been advanced as outlined above to give critics of Billboards and Electronic signs cover in the guise of a supposed traffic safety argument to support the tight regulation and elimination of Electronic signs in all applications. Up to this time, opponents of Billboards and Outdoor Advertising Signs have used the political process and our Court system to oppose these signs under the pretext that Billboards and Outdoor Advertising Signs should be restricted and eliminated for aesthetic reasons, and for reasons based on the Highway Beautification Act (see below for a discussion of the HBA). What the 2009 NCHRP Wachtel Report presents us with is a theory, advanced by a presumed unbiased researcher, that is not supported by any direct evidence, not based or supported by any new research by the author, and is contradicted by research conducted by reputable universities and professionals in this field. In addition, the NCHRP Wachtel Report goes out of its way to dismiss and "debunk" any research that has been conducted on EMC signs where no driver distraction or accident issues have been found.

If one were to believe the Wachtel Report's attacks on EMC research, the following would be true: (a) drivers do not report their accidents that involve EMC signs because drivers under-report all types of accidents, including accidents on Interstate Highways where injury to life and property occurs; (b) drivers are too scared to admit that an EMC sign caused the accident; (c) investigators fail to ask the right questions after a crash (i.e. "Miss, did that EMC sign over there cause the accident?"); (d) drivers are unaware that EMCs are causing them distraction and causing accidents, but we can assume they are looking at them generally, so we can assume that EMCs are causing accidents but drivers do not remember (hard to argue that one).

The 2009 Wachtel NCHRP report exists in a broad context. That is why questions can be legitimately raised about the 2009 NCHRP Wachtel Report's objectivity and impartiality, and the validity of its assertions, particularly when used by those that oppose EMC signs and modern technology.

Items of note in this review of the Wachtel report:

a. The actual Recommendations contained in the 2009 NCHRP Wachtel Report are surprisingly limited in scope in regard to Digital Signs used on Outdoor Advertising Sign structures. The Wachtel Report includes a very basic set of recommendations, covering among other items: minimum message display duration; message sequencing; amount of information displayed; brightness, luminance and illuminance. All of these items are already being regulated or controlled by governmental agencies and end users.

b. In 1980, the FHWA published the antecedent to today's 2009 NCHRP Wachtel Report on DBB / EMCs, titled *Safety and Environmental Design Considerations in the use of Commercial Electronic Variable-Message Signage.* Authors listed were Jerry Wachtel and Ross Netherton. A brief history of that report contained in this review is relevant to an appreciation of the 2009 NRCHP report in several respects.

c. In 2009, as in 1980, Wachtel the author goes to great lengths to criticize any research that shows no correlation between EMCs and traffic accidents. The reasons given are typically faulty research or unreliable research methods, but the subtext to these criticisms is that the research was funded by some "industry-related" group or interest, or that it fails to support Wachtel's own theory on DBB / EMCs. Whether the reference point is 1980 or 2009, all of this criticism should be considered an attempt to move the goal posts in the middle of the game because the author does not like the results he has been given. If we accept the scientific method and the trust the results of studies involving real events and people, then the information gathered from these studies must be accepted and recognized. Instead, Mr. Wachtel often wishes to place theoretical extrapolations based on human factors research above actual results based upon actual events.

d. The 2009 NCHRP Wachtel Report contains a Literature Review of research related to Electronic signs. Surprisingly, only a low percentage of the literature reviewed (26%), and upon which Mr. Wachtel builds a foundation for his theories, involved field or test track studies or research on actual traffic accidents.

e. The 2009 NCHRP Wachtel Report includes a discussion of terms and concepts used in the field of Human factors research as they apply to DBB / EMC signs. Included in this discussion is reference to a human factors phenomenon called the "Zeigarnik Effect". A discussion of the so-called Zeigarnik Effect is relevant to an understanding of the mindset of DBB / EMC regulators and advocates of DBB / EMC prohibitions. In fact, even before the publication of the 2009 Wachtel NCHRP report, other professional organizations and legal experts were issuing warnings about the potential dangers of the Zeigarnik Effect as it may relate to DBB / EMC messages. Promotion of the Zeigarnik Effect reveals just how far some will go to dress up their aesthetic objections to Electronic Signs in the guise of supposed scientific theory.

f. The 2009 NCHRP Wachtel Report places great emphasis on the quality of testing and results obtained in two companion documents on Drivers and Driver Inattention*: (1) The 100-Car Naturalistic Driving Study Phase II – Results of the 100-Car Field Experiment* and *The Impact of Driver Inattention On Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data*. Both were performed by the Virginia Tech Transportation Institute (VTTI) for the National Highway Traffic Safety Administration (NHTSA), and were released in April 2006. The 100-Car Naturalistic study was a comprehensive and in depth analysis of the actual driving behaviors displayed by Drivers.

These studies are mentioned here because the methodology and results obtained in the VTTI research provide a vital ingredient to those that espouse the Wachtel theory on DBB / EMCs and driver interaction: by a certain percentage, VTTI says that Drivers can have accidents when they are inattentive to the driving task for 2 seconds or longer. Regrettably, the Wachtel Report cherry-picks concepts from the VTTI Research and, in a sense, misrepresents the research and its findings to serve the assumed goal of enhancing the Wachtel EMC theoretical construct.

g. The 2009 Wachtel Report also attempts to deal with On Premise EMC Signs, though this is completely outside the scope of the NCHRP report request. The section on On Premise EMC sign applications includes claims regarding EMC cost; EMCs and Local Sign Codes; and Local Sign Code Dimensional and sign location issues. Many of the claims made by the Wachtel Report in regard to On Premise EMCs are incorrect.

h. The Wachtel Report's "Summary and Conclusions" section provides the best insight into the author's theories and true state of mind. And to that end, the Wachtel Report fights an uphill battle on several key points, and fails the test presented by *Occam's Razor* in particular. *Occam's Razor* is both a scientific principle and a historic philosophical tenet that has relevance to the entire subject matter of DBBs, EMC signs, traffic safety, accidents, and the 2009 NCHRP Wachtel report. *Occam's Razor* can be stated as follows (the text and meaning have evolved over the years):

> *Of two equivalent theories or explanations, all other things being equal, the simpler one is to be preferred.*

On the one hand, the 2009 NCHRP Wachtel Report has advanced a theory that DBB / EMCs are dangerous from a traffic safety perspective, and ought to be more tightly regulated in the future. The Wachtel Report Theory is complicated and attempts to join findings from unrelated

Research to address the wholly separate issue of DBB / EMC signs. There is no primary research on or direct proof of the theory. On the other hand, others have claimed that there does not appear to be an issue here with DBB / EMCs and traffic accidents and/or crashes, if one considers the actual research on EMCs, accidents and Driver Distractions, because no linkage has ever been found. And this is by far the simpler theory. In fact, the competing "theories" are not generally equal, as Mr. Wachtel can offer no direct research to back up his theory.

At the end of the day, as per *Occam's Razor*, a linkage has to be demonstrated between EMCs and traffic safety / accidents / crashes. We live in a society that accepts the principles contained in the Scientific Method. Researchers in all fields live by and apply these principles in their endeavors. The Scientific Method is a means by which an inquiry is based on gathering objective, observable and measurable evidence. One starts with a hypothesis and proposed conclusion, an objective method of testing the hypothesis is engaged that can be duplicated, the data is obtained, and then conclusions are drawn as to whether they hypothesis was in fact correct.

Instead, Mr. Wachtel invites the reader to take a circuitous path around existing studies on DBB / EMCs and traffic accidents and Driver Distractions, to avoid this information, in order to reach another plateau where the studies are immaterial and a paradigm based on theoretical conclusions serves as proof of the hypothesis.

Unfortunately, the 2009 NCHRP Wachtel report does not exist in a vacuum, and already commentators are offering their own interpretations and providing their own explanations of the 2009 NCHRP Wachtel Report.

And these groups have already said: *"The Wachtel report proves that DBB / EMC signs are a traffic hazard"* and *"The Wachtel report demonstrates that research funded by Industry is flawed and biased".*

The 2009 NCHRP Wachtel Report neither "proves" anything in regard to EMCs, Billboards, and accidents nor objectively demonstrates there is any error in the findings of research funded by Industry. But in paraphrasing words attributed to Mark Twain: "A lie about EMCs and traffic safety can travel halfway 'round the world while the truth is putting on its shoes."

1. Introduction

The following review of the 2009 NCHRP Wachtel Report is an extensive examination of the statements and theoretical underpinnings advanced by Mr. Wachtel in his Report. The 2009 NCHRP Wachtel Report is indeed a lengthy and scholarly document, with complete documentation and in-depth discussion of research on EMCs.

This review will:

a. examine the 2009 NCHRP Wachtel Report on a Section by Section basis;

b. examine the overall theory on DBB / EMCs / Digital Display Technology espoused by the 2009 NCHRP Wachtel Report that is based on certain human factors principles; and

c. examine issues immediately related to the 2009 NCHRP Wachtel Report, but may be outside the document itself; and

d. examine the Recommendations contained in the 2009 NCHRP Wachtel Report;

In addition, this review of the 2009 NCHRP Wachtel Report will examine both the Text of the Wachtel Report and the Sub-text, because there are matters surrounding Electronic signs and billboards that, if understood by the reader, will provide a greater understanding of the entire subject and the 2009 Wachtel NCHRP Report.

The Research Problem Statement of the 2009 NCHRP Wachtel Report gives this outline for the new Wachtel Digital Sign study:

TASKS
Accomplishment of the project objectives will require the following tasks:

Task 1. Conduct a literature review of existing guidelines and research results.

Task 2. Identify the human factors elements directly related to the operating characteristics of the new digital technology outdoor advertising signs

Task 3. Conduct a critique of research reports undertaken by, and published by, the outdoor advertising industry

Task 4. Review the experiences of other countries with the new digital technology outdoor advertising signs

Task 5. Prepare a draft final report documenting the results of Tasks 1-4, including recommended guidance related to the safety aspects digital display technology for outdoor advertising signs.

Task 6. Considering the project panel's comments, revise and submit the final report.

Terms

As indicated in the title, the new NCHRP report deals with "digital display technology" for "outdoor advertising signs". The phrase "digital display technology" is a descriptor used to reference signs that are electronic, illuminated, and use computer-based hardware and software to display text and images on signs that can be changed. The "end-user" has flexibility in changing and revising the messages. For manufacturers and End-users of this technology, the most common name used to describe this sign technology is Electronic Message Center (EMC). The Federal Highway Administration (FHWA) defines EMCs as "programmable displays that have the capability to present a large amount of text and/or symbolic imagery. Some [EMCs]

present images in realistic motion and in a large variety of colors" (FHWA, 2001). In the following report review, the acronyms DBB and EMC will be use jointly wherever possible.

However, there are other terms sometimes used to describe these signs. In the transportation research community, and as found in the 2009 NCHRP Wachtel Report, they are often called changeable message signs, dynamic message signs, or commercial electronic variable message signs (CMS, VMS, or CEVMS, respectively).

At the time of this writing, the primary Lighting technology used in the United States to create these displays is LED technology (light emitting diodes). Virtually all Off Premise and On Premise DBB / EMC signs currently being installed use the LED technology. Older sign lighting technologies have been discarded: lamp bulb and flipping panels/discs being the two main techniques previously used.

The phrase "outdoor advertising signs" is a descriptor often used to refer to Off Premise signs or Billboards – any type of sign or advertising displayed on a structure or wall that displays messages that do not pertain to the use or property upon which the sign is installed. In the specific context of the 2009 NCHRP Wachtel Report, DBB / EMCs are also known as video billboards, electronic billboards, digital billboards (DBB) and electronic message displays.

In summary, the 2009 NCHRP Wachtel Report therefore is about EMCs that are used in the context of "Off Premise" advertising, commonly known as Billboards (DBB).

The Transportation Research Board (TRB), based in Washington D.C, oversees a number of major research programs sponsored by other governmental and academic organizations. The oldest and largest of these programs, the National Cooperative Highway Research Program (NCHRP), is sponsored by the state transportation departments - American Association of State Highway and Transportation Officials (AASHTO) - in cooperation with the Federal Highway Administration (FHWA).

The TRB's website reports that it *"annually engages more than 7,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest by participating on TRB committees, panels, and task forces. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation.*

2. Why is a review of the 2009 NCHRP Wachtel Report important?

The 2009 NCHRP Wachtel Report is a policy document, planning document, and in large measure a legal document. Although requested by the entities that comprise the NCHRP, in fact most State DOTs already regulate EMCs on Billboards in accordance with current FHWA guidelines in much the same manner that the 2009 NCHRP Wachtel Report recommends. There are differences of course, but they are relatively minor differences – differences in change rate

etc. In fact, the Outdoor advertising industry has Standards that its members follow, and these standards are in line with the State DOT regulations. Reason: in order to qualify for federal funding, states must follow FHWA guidelines for DBB / EMCs in addition to other transportation guidelines. If the purpose of the 2009 NCHRP Wachtel Report was to advise the members of the funding group on DBB / EMC usage on Billboards, one has to wonder, rhetorically, why the report was needed in the first place. The United States does not have a crisis in traffic accidents related to DBB / EMCs at the present time, nor is one anticipated in the future.

The NCHRP (National Cooperative Highway Research Program) is connected to the member departments of the American Association of State Highway and Transportation Officials (AASHTO) All of the state highway and transportation departments (DOTs) contribute to an annual funding pool to finance the program's activities i.e. sponsor projects like the Wachtel NCHRP.

People interested in regulating and prohibiting DBB / EMCs in other types of sign applications (on premise signs, billboards not on Federal or State highways etc) are really the intended audience for the 2009 NCHRP Wachtel Report, and if not the intended audience, they are the *de facto* audience for the report.

In addition, members of the respected planning community are part of the intended audience, whether they are in private practice or work for local, regional, or state planning departments and commissions. Planners receive information about signs, after their undergraduate and graduate work, either on the job, from colleagues, from planning documents, from seminars held at planning association activities and from participation in certification programs through the national association of planners, the American Planning Association (APA).

Professionals, even the most thorough and astute professionals, are not going to read through all 194+ pages of the 2009 NCHRP Wachtel Report on DBB / EMCs. They may read the conclusions, the executive summary, the recommendations, or may gather this information from others in seminars and workshops, where the report can be distilled and summarized for them. It is in these venues, in particular, that more harm than good can occur. If one has not read the Wachtel report critically and has no background in regard to signs and DBB / EMCs, and hears that the 2009 NCHRP Wachtel Report "proves that EMC signs are a distraction to drivers and must be regulated even more stringently, or banned altogether", then one will probably accept these statements as a fact, and repeat them, given the source of the comment. Does the 2009 NCHRP Wachtel Report prove that DBB / EMCs are a driver distraction that results in accidents? In all honesty, it does not, but that fact cannot stop the ripple effect if someone says it, and the report itself is daunting to read.

3. Historical Context – The HBA and Billboards

A more complete understanding of the 2009 NCHRP Wachtel Report can be obtained by viewing the report in context. There is of course the more immediate and specific context of the 2009 NCHRP Wachtel Report as described in the review to follow. The Wachtel report also can

be viewed in an even broader context, one that includes Billboard companies, the Outdoor Advertising Association of America (OAAA), opponents of Billboards and the Federal Highway Administration. The time frame of this context covers not just years, but decades of history. And in viewing the 2009 NCHRP Wachtel Report in its broader context, one can appreciate the origins of the controversy about Billboards in general and DBB / EMC signs specifically.

The broader context of the regulation of DBB / EMCs and Billboards begins with a brief review of the Highway Beautification Act (HBA). The FHWA oversees all Billboards located on Federal Highways indirectly through a Federal statute and program called the Highway Beautification Act, and subsequent amendments and revisions. The FHWA gives this background at the FHWA website concerning the HBA:

> *How the Highway Beautification Act Became a Law*
>
> *In announcing an America the Beautiful initiative in January 1965, President Lyndon B. Johnson said:*
>
> *"I want to make sure that the America we see from these major highways is a beautiful America."*
>
> *The cornerstone of the initiative would be the Highway Beautification Act of 1965, which called for control of outdoor advertising, including removal of certain types of signs, along the Nation's growing Interstate System and the existing Federal-aid primary system.*
>
> *The President signed the Highway Beautification Act on October 22, 1965.*

The primary mover and shaker behind the President's embrace of the HBA was the first lady, Lady Bird Johnson. Many have observed that the final HBA bill and the subsequent Amendments represented a compromise between the White House and the Outdoor Advertising Association of America (OAAA). Billboards were banned "except in those areas of commercial and industrial use." Later an additional amendment was created requiring the government to provide "just compensation" to owners for losing their billboards.

The HBA was considered a victory for President Johnson and for the Lady Bird's beautification efforts. Critics over the years have claimed that the HBA was so watered down that it did more harm than good to the visual landscape.

FHWA states the following in regard to the Highway Beautification Act:

> *The HBA, codified at 23 U.S.C. §131, is a grant-in-aid condition that States must comply with in order to receive full Federal-aid highway funding. The FHWA is the agency charged with implementing the HBA. See 49 CFR §1.48(b)(21). The HBA requires States to "effectively control" outdoor advertising along certain Federal-aid highway systems. These highway systems are the Interstate system, the Federal-aid primary system (as it existed on June 1, 1991), and the National Highway System. Under §131(b), the failure to*

comply with the HBA can subject a State to the loss of ten percent of its Federal-aid highway funds.

The purposes of the HBA are set forth in 23 U.S.C. § 131(a): to protect the public investment in highways; to promote the safety and recreational value of public travel; and to preserve natural beauty. Outdoor advertising is not banned outright by the HBA. Congress specifically allowed outdoor advertising in valid zoned or unzoned commercial or industrial areas. Section 131(d) acknowledges that "States shall have full authority under their own zoning laws to zone areas for commercial or industrial purposes, and the actions of the States in this regard, will be accepted for the purposes of this Act."

Note: On Premise signs, including signs with EMCs, have historically been exempted or not regulated by the HBA and the FHWA, based upon a variety of factors.

Many individuals and groups have expressed displeasure over how the HBA has been administered by the FHWA, and the HBA's failure to eliminate Billboards and "visual blight". In the intervening years, opposing sides have been established in this discussion or debate, and/or internecine warfare. Representatives of those who oppose new Billboards and Billboards in general are often represented by or involved with, even tangentially, an organization titled Scenic America.

The sentiments shared by many who oppose Billboards are illustrated perhaps best in a piece written by Charles F. Floyd, Professor of Real Estate at the University of Georgia, in 1982. Titled *Requiem for the Highway Beautification Act,* Professor Floyd wrote the following:

The Highway Beautification Act is a failure. It has been unsuccessful in either removing existing billboard clutter from rural roadsides or preventing its spread. In the past several years the act has become even more ineffective, being almost totally transformed into a sign industry dominated program that is actually enriching and subsidizing the industry it was meant to regulate, and serving as a protective umbrella to shield that industry from state and local governments that desire to effectively control billboard blight. Repeal or extensive revision of the HBA now appears to offer the only hope for achievement of the original aims of the beautification program.

Nearly seventeen years later, Scenic America wrote on its website (6.18.09 - www.scenic.org)

HBA: Facts & Figures
Though the billboard lobby clings to the HBA, portraying it as "a law that works," the fact is, as the US Department of Transportation Inspector General said in 1984, the HBA "has been ineffective in improving highway beautification as the number of signs located adjacent to the nation's highways continues to increase... [It has] had little impact on enhancing the scenic and recreational value of highways."

Here's what's wrong...

Thousands of new billboards are constructed annually.

One cannot accurately describe the antipathy that many in this country have towards Billboards and Outdoor Advertising; the feelings are strong and run deep. DBB and Electronic Message Centers are in part serving as a lightening rod for opponents of Billboards, galvanizing support for controls on and elimination of Billboards in general, especially those with EMCs.

To call the debate over time bitter would be a gross understatement. Outdoor Advertising companies often engage in litigation over local Billboard approvals. They often challenge entire local Sign Codes on constitutional grounds. They use litigation or the threat of litigation to extract compromises and approvals from municipalities. All of this activity is perfectly legal, and a business's right under our system of free enterprise; no excuses need be made in this regard. Municipalities in turn have to make hard decisions on how they craft their local Outdoor advertising regulations, and whether they should spend taxpayer resources in defending against Outdoor Advertising company claims. Often neighborhood and citizen groups are formed to assist in defending what are perceived to be attacks by Billboard companies; Planning professionals even write papers and provide seminars on how local municipalities can avoid or win lawsuits involving Outdoor Advertising companies.

And so two heavyweights (OAAA and Scenic America) have battled it out, across the country, over a period of decades. In the one corner, we have Scenic America and related organizations and individuals who detest Billboards and believe that the HBA did not work as it should have in regard to removing or extinguishing Billboards. In the other corner, we have OAAA and related organizations and Billboard owners and advertisers, who feel they are operating within the context of the law and have an inherent right to operate a business and display Outdoor advertising.

The rhetoric from the Scenic America side is highly charged, and one can imagine that, in their minds, they are dealing with matters of morality, or right vs wrong, or good vs evil. The rhetoric from the OAAA Outdoor advertising side is often more muted, extolling the virtues of Off Premise advertising and compliance with the law. Many view the Outdoor Advertising industry as extremely wealthy, which furthers the David vs Goliath mentality that permeates much of the opposition to Billboards and EMC Billboards.

In the middle reside the vast majority of citizens. Some appreciate signs of all types, some do not care one way or the other, and others do not appreciate Billboards when asked but raise no objections in general.

And finally, also in the middle, resides the On Premise sign industry, and the On Premise sign industry is often painted by the same broad brush stroke of dislike that is displayed toward Off Premise signs and Billboards. If people hate billboards, they may only begrudgingly acknowledge the value of On Premise signs, if at all. On Premise sign size – a good sign being a small sign – becomes a matter of aesthetics and control, despite the overwhelming evidence that inappropriately sized On Premise signs (i.e. small signs) can create traffic safety issues for Motorists.

In conclusion, the 2009 Wachtel NCHRP report exists in a broad context. That is why questions can be legitimately raised about the 2009 NCHRP Wachtel Report's objectivity and bias, and the validity of its recommendations.

Mr. Wachtel has held himself out as a presumed unbiased observer. He apparently believes that Industry-sponsored research is flawed and biased, as he stated in his report. In point of fact, everyone has a bias, or has his or her own personal viewpoint.

Today, after publication of NCHRP report in April 2009, the author is making the rounds, in fact speaking at Scenic America events on topics such as "Safety Implications of Digital Signs" (national Billboard Seminar in August 2009; co-sponsored by Scenic America and Scenic Missouri). He is also serves as an expert witness for municipalities in cases involving Billboards and EMCs. And he has presented PowerPoint sessions where he has attempted to secure his credentials by suggesting that he is unbiased. In June of 2009, Mr. Wachtel presented a seminar to ASHTO SCOTE in Manchester, New Hampshire, where he stated:

> *"I have worked for the industry, including OAAA, NESA, and large outdoor advertising firms such as Lamar and Infinity."*

In regard to the NESA (National Electric Sign Association) claim, it should be noted that NESA does not exist today; that organization's name was revised in the late 90's to the International Sign Association (ISA). When contacted directly, ISA has no recollection or records indicating whether Mr. Wachtel in fact worked for then NESA, or what the work might have involved.

4. Review of 1980 FHWA Report

In 1980, the FHWA published the antecedent (or perhaps distant cousin) to today's 2009 NCHRP Wachtel Report on DBB / EMCs, titled *Safety and Environmental Design Considerations in the use of Commercial Electronic Variable-Message Signage*. Authors listed were Jerry Wachtel and Ross Netherton. A brief review of that report is relevant to an appreciation of the 2009 NRCHP report in several respects.

Blurred Lines Between On and Off Premise Signs

The 1980 FHWA report was specifically focused on <u>On Premise</u> EMCs that appear on Federal Interstate Highways governed by the Highway Beautification Act of 1965. In the 1980 report, the term Commercial Electronic Variable-Message Sign or CEVMS was often used to describe On Premise EMCs adjacent to Federal Highways. The report was not directed at Off Premise EMCs or Digital Billboards (DBB) or "Outdoor Advertising Signs" or Billboards, though it would be extremely difficult for the reader to keep this distinction clear, as the authors of the 1980 report did mix references to both On Premise EMCs applications and Off Premise EMC applications throughout the report. Because of the blurring of the lines between On Premise and Off Premise sign applications, the average reader would have a very difficult time even remembering the distinction, after reviewing the 1980 report.

The same is true for the 2009 Wachtel EMC report, though in reverse. The 2009 report begins with the premise contained in the NRCHP Research Problem Statement: that the funded study was specifically related to Outdoor Advertising Signs (Billboards); the 2009 report then veers consistently over to discussing EMCs in On Premise sign applications, and mixes the references throughout the document so much so that the end result is confusion in the mind of the reader: was the report about Off Premise EMCs, or On Premise EMCs, or both?

Technology is Similar 1980 to 2009

There are numerous illustrations in the 1980 report – (21) total. Some merely show a chart or graph. Interestingly, many contain photographs of Electronic signs and billboards, as they appeared in 1980. And these Electronic signs look and operate in the same basic fashion as EMCs today. Technological advances since 1980 have seen a shift to LEDs for illumination, and to a greater resolution in the images shown on the signs (sharper, clearer images in other words), but the operational aspects have remained constant over time. Technological features such as scrolling, frame effects within the graphics, change rate of the messages etc have been present for the past 30 years.

Suggestions in the 2009 NCHRP Wachtel report that DBB / EMC technology has somehow changed radically over time, thereby requiring special vigilance, are grossly exaggerated, but serve to alarm the audience intended for the report.

Opponents of current DBB / EMC LED technology are quick to point out that the technology is much more advanced than it was in 1980. In part, this observation is true, but only in this sense – the technology has gotten better (the images are improved) and the technology is more reliable (outages and sign repairs have become less frequent). But this "advancing technology" argument is perhaps exaggerated to an unreasonable degree given the facts, and the effects on Drivers of the technological improvements are also often exaggerated.

In reality, the signs installed by Billboard companies in 1980 used a variety of technologies: lamp bulb arrays, LED changing message signs were emerging, and mechanical changing message centers and Tri-vision signs were also common. All of the changing message technologies available in 1980 operated in much the same manner as today's LED DBB / EMCs – the signs had variable or changing messages controlled by machine or computer in specific time frames and were viewed by Motorists traveling down Federal Highways at speeds comparable to today's drivers.

Accident Research shows no connection

Even in 1980, Mr. Wachtel, a researcher for FHWA, can only begrudgingly admit to what the research on DBB / EMCs and traffic accidents says - that there is no relationship between DBB / EMCs and traffic accidents, and uses weak sentence structure to perhaps blunt its meaning. The 1980 FHWA report states: *"the available evidence remains statistically insufficient to scientifically support this relationship".* The phrase "this relationship" refers to the supposed relationship between DBB / EMC signs and traffic accidents, or lack thereof.

Context of Aesthetic Considerations

In 1980, Mr. Wacthel lists two other considerations that he deems important enough to warrant inclusion in the 1980 FHWA report: Human Factors Considerations and Aesthetic Considerations. Even in 1980, Mr. Wachtel has established the conflict between the traffic safety and accident research (no accidents found) versus Human Factors research analogies (we think there must be accidents). And then adds the subjective Aesthetic Considerations factor into the mix, to tip the scale.

Aesthetic considerations were discussed at length in the 1980 report, applying mainly to Billboards and Outdoor Advertising devices. This discussion was couched in relatively objective language, but the subject matter and emotions running beneath the discussion remain with us today: a portion of the population finds Outdoor advertisings signs (Billboards) to be a blight upon the landscape; the Highway Beautification Act ought to operate to remove and prevent these blights; scenic vistas are ruined by Outdoor signs. There is no discounting or ignoring the feelings held by some of our fellow citizens in this regard.

1980 Recommendations

The actual recommendations found in the 1980 FHWA report are very basic:

> Recommended Message duration On time: 3 lines of 20 characters 15 seconds maximum
> Change promptly / immediately in clean fashion
> No animation or message flow

Continuing Absence of Evidence

The 2009 NCHRP Wachtel Report has declared that we now have enough research from the Human Factors side due to all the new research on DBB / EMCs coming in to make conclusions about the safety of DBB / EMCs along the highways. Interestingly, Wachtel the author 29 years earlier made much the same statement, even though that research had not been conducted yet.

In 1980, as in 2009, Wachtel the author goes to great lengths to criticize any research that shows no correlation between EMCs and traffic accidents. The reason given is often faulty or unreliable methods, but the subtext to these criticisms is that the research was funded by some "industry-related" group or interest, or that it fails to support Wachtel's own theory on DBB / EMCs.

In 1980, as in 2009, all of this smacks of an attempt to move the goal posts in the middle of the game because the author does not like the results he has been given. If we accept the scientific method and the trust the results of studies involving real events and people, then the information gathered from these studies must be accepted and recognized. Instead, Mr. Wachtel often wishes to place theoretical extrapolations based on human factors research above actual results based upon actual events.

In 1980, Mr. Wachtel could have said: *"we don't see any correlation between EMCs and traffic accidents or near crashes based upon available data; but we in the human factors field believe there is some cause for concern based on the characteristics and operation of EMCs, and therefore further study is needed and some restraint should be employed in the use of EMCs as outlined in this report",* but did not. This would have been the more academic response.

Leaving 1980 aside, why doesn't the 2009 NCHRP Wachtel report say this? Reason: because the 2009 report is directed at forcing an outcome, not in merely making suggestions. After 29 years of looking at DBB / EMCs, at a certain point, one may prefer to be on the field of play, and not sitting on the bench giving advice.

5. Review of Sections 2 & 3 of the Wachtel Report - Literature Review

The Research Problem Statement of the 2009 NCHRP Wachtel Report gave the requirement that the Report "conduct a literature review of existing guidelines and research results" and examine existing research on DBB / EMCs / Digital Sign technology. The 2009 NCHRP Wachtel Report Section 2 contains a summary of many but not all research conducted related to DBB / EMCs from 1983 to 2009.

It is important to examine the research summarized by the 2009 NCHRP Wachtel Report because it later serves to bolster the Wachtel theory that Drivers glance at DBB / EMC signs **and** have accidents, or that DBB / EMCs create the real potential for accidents (to be distinguished from only the "theoretical possibility" or even "likelihood" for accidents), and that DBB / EMCs are the type of object that Drivers look at in disregard to the immediate Driving task, as we can document with cell phones, texting while driving, and manipulating GPS devices, to name a few real causes of Driver Inattention and crashes.

An examination of the body of the literature reviewed by the 2009 NCHRP Wachtel Report reveals that, surprisingly, only a low percentage of the literature reviewed, and upon which Mr. Wachtel builds a foundation for his theories, involved actual field or test track studies or research on actual traffic accidents and incidents. The reader, when confronted by the voluminous literature review presented by the 2009 NCHRP Wachtel Report, will tend to move to other sections of the report and conserve time; the Executive Summary and Report Recommendations and Conclusions are areas where information can be typically gleaned in a more efficient manner. But, when one examines the actual literature being reviewed, one cannot help but notice the lack of depth in the areas of actual research in the field or test tracks or accident analyses; and that a majority of the "field research" does not involve DBB / EMC signs; in addition, simulated Lab studies and theoretical human factors papers can only go so far in being relevant to the actual use of DBB / EMC signs and Driver interactions.

There are (46) documents or reports listed in Section 2 of the 2009 NCHRP Wachtel Report; of which at least (5) are so-called "Industry" reports, which Wachtel only lists in Section 2 and does not discuss; he also does not rely on any Industry reports to support his theories. There are then (41) Reports discussed in the 2009 NCHRP Wachtel Report that are "Non Industry".

A breakdown of the type of research involved in the Non Industry listed reports is as follows:

(11) Field/Test Track (Note: one being a single participant Pilot test study) 26.83%

(11) Lab testing 26.83%

(19) Research review, theoretical analysis and/or summaries of other work 46.34%

Below is a chart that lists the literature reviewed in the 2009 NCHRP Wachtel Report.

Author	Year	Review / Theoretical	Lab test	Field Test	Country
Perception Research Services	1983* - industry				US
Cole and Hughes	1984			Yes	Australia
Young, E.	1984* - industry				US
Pottier, A.	1988		Lab		US
Transportation Environment Consultants (TEC)	1989	Yes			Australia
Brown	1989		Lab		US
Rahimi, Briggs, and Thom	1990			Yes – 1 Pilot test	US
Wisconsin Department of Transportation District 2, Freeway Operations Unit	1994			Yes	US
Akagi, Seo, Motoda	1996			Yes	Japan
Bergeron, J.	1996	Yes			Canada
Bergeron, J.	1996	Yes			Canada
Schieber and Goodspeed IV	1997		Lab about traffic signs		US
Theeuwes, et al.,	1998-99		Lab		US
Cairney and Gunatillake	2000	Yes			Australia
Farbry, et al.,	2001	Yes			US - FHWA
Beijer	2002			Yes but no EMCs	Canada
Young and Regan	2003	Yes			US
Wallace, B.	2003	Yes			US
CTC & Associates	2003	Yes			US
Lansdown	2004	Yes			US
Finnish Road Administration	2004	Yes			Finland
Smiley, Smahel, and Eizenman,	2004			Yes	Canada
Beijer, Smiley, & Eizenman, M.,	2004			Yes	Canada
Smiley, A., Persaud, B., Bahar, G., Mollett, C., Lyon, C., Smahel, T., & Kelman, W.L.,	2005			Yes	Canada
Klauer, Neale, Dingus, Ramsey, & Sudweeks (VTTI)	2005			Yes EMCs not mentioned	US
Klauer, S.G., Dingus, T.A., Neale, V.L., Sudweeks, J.D. & Ramsey, D.J. (VTTI)	2005			Yes EMCs not mentioned	US
SWOV Institute for Road Safety Research	2006	Yes			Netherlands
Road Safety Committee	2006	Yes			Australia
Klauer, Sudweeks, Hickman, & Neale (VTTI)	2006			Yes EMCs not mentioned	US
Crundall, Van Loon, and Underwood	2006		Lab		UK
Horrey and Wickens	2007		Lab		US
Clark and Davies	2007		Lab		US

Author	Year	Review / Theoretical	Lab test	Field Test	Country
Lee, McElheny, & Gibbons	2007 - industry				US
Perception Research Services	2007 – industry				US
Shinar	2007	Yes			US
Tantala & Tantala	2007 - industry				
Young, M.S., & Mahfoud, J.M.,	2007		Lab		US
Chan, Pradhan, Knodler, Pollatsek and Fisher	2008		Lab		US
Lazarus	2008	Yes			US
Speirs, Winmill & Kazi	2008	Yes			UK
Dudek, C.,	2008	Yes			US
Edquist, J.,	2009a,	Yes			US
Edquist, J.,	2009b		Lab		US
Fisher, D.,	2009		Lab		US
Martens, M.,	2009	Yes			Netherlands
Molino, Wachtel, Farbry, Hermosillo & Granda	2009	Yes			US

(A) Only 26% of the Research literature discussed by the 2009 NCHRP Wachtel Report was "field" research; In addition, the 26% number is generous, as it included in "field" research a study that was a pilot study apparently with only one test participant, and would not be considered scientifically or statistically valid.

(B) 26% of the Research reviewed by the 2009 NCHRP Wachtel Report involved Lab testing and simulator-style studies. While lab testing is an improvement over theoretical analysis and conjecture, or mere polling, true Field Testing or analysis of actual events will yield the most accurate results (results that reflect what happens in the real world). Even Test Track studies, with actual vehicles in an outdoor environment, can vary significantly from actual real world Field testing.

(C) The percentage of reviewed work that involved a review of other literature and then theoretical postulations, or a review of research with conclusions derived from that research, was quite substantial: 46 %. Some research reviews can be quite important, but others can tend toward becoming a rehash of the work of other researchers and then advancement of theories that somehow augment or compliment this work, which others can then comment on or revise, creating a daisy chain effect of researchers commenting on researchers. The source material is often then lost or obscured in the process.

(D) The Percentage of Field Research that found an actual connection or causation effect between DBB / EMCs and accidents or near accidents – 0%. The Wisconsin study included did show increased accidents along the Highway (where there was an interchange) after a DBB was installed, but the report appeared to be muddled and confounded by variables that were not defined or accounted for, and the 2009 NCHRP Wachtel Report does not positively endorse the methodology of this study.

Section 3 of the Wachtel Report represents an opportunity to "de-bunk" significant research conducted by leading universities and professionals. Apparently the source of the funding of the

research (industry) affects the objective data gathered and the methods used in the testing or information collection.

Bottom line: there is always room for healthy debate and disagreement when Research is conducted and experts then review and comment on that research. It is to be expected. The Wachtel report goes beyond normal academic courtesies and labels work that does not coincide with his theories as "biased" and "misleading". The Wachtel Report's own point of view could not be made clearer.

6. Review of Section 4 of the Wachtel Report - Human Factors Issues

The 2009 NCHRP Wachtel Report includes a discussion or listing of terms and concepts used in the field of Human factors research as they may apply to DBB / EMC signs.

Items of note

A. For some unknown reason, Mr. Wachtel thinks that principles that govern signs installed under the MUTCD – the *Manual on Uniform Traffic Control Devices* published by the FHWA – somehow have application and relevance to larger DBB and EMC signs. Signs governed by the MUTCD would include: traffic signs, regulatory signs, speed limit signs and so forth. These signs are typically installed by governmental entities immediately adjacent to the roadway and contain information essential to the Driving task. They contain no commercial messages or First amendment speech – just directional or regulatory information. Billboards and Off Premise Outdoor advertising signs are just the opposite; they contain information that is in no way vital to the Driver or driving task, and can be viewed or not viewed, depending upon conditions, and the Driver is in no better or worse position either way.

B. The Zeigarnik Effect is mentioned again, as if it applies to signs and as if there have been studies performed related to signs and the Zeigarnik Effect, which in fact have not occurred.

C. Most interesting: Mr. Wachtel, in a footnote at the conclusion of this Section, attempts to weigh in yet again on the "flashing sign" issue, after almost 30 years of settled regulation holding that DBB / electronic signs do not flash within the various statutory definitions prohibiting so-called flashing or animated signs (and that DBB / EMCs are therefore permitted signs). One can find this regulatory application at the federal, state and local levels, and there is general uniform agreement on this point. Mr. Wachtel still contends that DBBs are flashing signs, even when they comply with accepted government regulations or recommendations.

7. Digital Displays and the "Zeigarnik Effect"

The 2009 Wachtel NCHRP report references a human factors phenomenon called the Zeigarnik Effect, most notably in Section 4 titled "Human Factors Issues". A discussion of the so-called

Zeigarnik Effect is relevant to an understanding of the mindset of DBB / EMC regulators and advocates of DBB / EMC prohibitions. In fact, even before the publication of the 2009 Wachtel NCHRP report, other professional organizations and legal experts were issuing warnings about the potential dangers of the Zeigarnik Effect (as it may relate to DBB / EMC messages).

Promotion of the Zeigarnik Effect reveals just how far some will go to dress-up their aesthetic objections to Electronic Signs in the guise of supposed scientific theory. To some this is science, and to others it is pseudo-science. The Zeigarnik Effect, as advanced by both planning professionals and researchers in the field of Human Factors, can be explained thusly:

> *"There are potential effects of video signs and EMCs on drivers where there are scrolling messages that require viewers to concentrate. Sequences of images or messages that tell a story may capture driver's attention for the duration. Anticipation of a new image appearing may distract the driver, who feels compelled to wait for the change."*

And the 2009 Wachtel NCHRP report states:

> *"The Zeigarnik Effect. In 1927, Russian psychologist Bluma Zeigarnik demonstrated that tasks that have been initiated by humans but, for whatever reason, interrupted before they could be completed, lead to feelings of anxiety and a desire to complete the task. In the years since the original demonstration of what we now call the Zeigarnik Effect, it has been shown that the discomfort related to task interruption has broad implications. For example it is thought that it is this phenomenon that causes drivers to continue looking at the changing messages on DBBs to learn what comes next; and it is the basis of the technique used in advertising in which a complete message is "sequenced" across several different signs or multiple message changes of a single sign."*

Notice the adroit language in this paragraph: the word "demonstrated" is inserted in the first sentence; and then in regard to DBB later the connection is weakened by saying "it is thought". Use of the word "demonstrated" in regard to signs and EMC / DBB applications is unfortunately incorrect, and who the "it" represents in the phrase "it is thought" is clearly open for investigation and/or speculation – perhaps only the regulators, and not the scientists. This type of loose language can only encourage misunderstanding about the interactions between Drivers and EMCs / DBB, and can unfortunately create an unintended Zeigarnik Effect bandwagon.

By way of background, Bluma Wulfovna Zeigarnik was born in Prienai, Russia on November 9th, 1900, and she was the Soviet psychologist who is reputed to have "discovered" the Zeigarnik effect. She graduated from the Berlin University in 1927, and she described the Zeigarnik Effect in a graduation paper prepared under the supervision of Kurt Lewin. Kurt Lewin was a German-American psychologist and modern pioneer of social, organizational, and applied psychology, and Gestalt psycho-therapy.

On the Internet, one can read many different versions of how Bluma Zeigarnik "discovered" the Zeigarnik Effect.

The story that has the most repetition is that Zeigarnik, while sitting in a restaurant in Vienna, noticed that a waiter could remember a seemingly endless number of items that had been ordered by his customers. However, once he had delivered the orders to the waiting diners, he no longer remembered what he had just served. Zeigarnik theorized that an incomplete task or unfinished business creates "psychic tension" within us. This tension acts as a motivator to drive us toward completing the task or finishing the business. In Gestalt terms, it was suggested that humans are motivated to seek "closure". So, the theory was advanced that unfinished actions or situations were better memorized than finished ones on the background of the inner psychic tension system (known as the "Zeigarnik effect").

The Zeigarnik Effect theory is then a Memory issue, and a psychological dynamic, not created in the context of modern Driving, operation of a motor vehicle, the visual landscape that a Driver encounters, or in regard to On Premise signs or EMCs / DBB. It was a pre-Depression Era psychological theory on the Mind, memory, and suspense. Some laboratory research has been conducted since 1927 on the Zeigarnik Effect, in regard to memory tasks.

In fact, writers and Advertisers are now touting the benefits of the Zeigarnik Effect for use as a device in stories and advertisements, where the reader or the consumer is thought to be compelled to go on with the novel or story or advertisement, just to understand the ending of the piece.

Yet now we have the attempt by some to associate the Zeigarnik Effect with DBB / EMC signs. It does have a somewhat emotional appeal. It also appeals to those who prefer to understand things intuitively or by common sense or by gut feeling (and that group may constitute 80 % of all local elected officials across the country). Is this connection justified? What is the connection between the Zeigarnik Effect and EMCs really based on?

As it turns out, there has been no research regarding the Zeigarnik Effect and On Premise signs and EMCs. In fact, there has been no research of any kind regarding signs and the Zeigarnik Effect, nor research involving people operating motor vehicles and the Zeigarnik Effect in general. It appears that the connection between the Zeigarnik Effect and Signs and EMCs is philosophical at best, but it is troubling nonetheless because well meaning individuals may repeat these claims as if they were true as applied to signs and EMCs.

Why doesn't the Zeigarnik Effect apply to DBB / EMC signs? First, there is a total lack of any empirical data showing that there is in fact a connection. It would seem to be inappropriate to continue to make claims if there was no demonstrated connection.

Second, in regard to DBB (that is: billboards with EMC signs on Federal Highways under the jurisdiction of State DOTs), there is no evidence that Drivers are "compelled" to look at EMC signs or memorize them, which appears to be one of the common themes advanced by proponents of the Zeigarnik Effect and EMCs, or that Drivers kook at EMCs beyond the time that is safe under existing driving conditions.

Another answer can be found in literature related to Driver Information Load. A 2003 United States Sign Council White Paper titled *On-Premise Commercial Signs and Driver Information Load* authored by Philip Garvey, a human factors researcher at Penn State, discussed the fear that some Towns have regarding On Premise signs thusly: *"It has been suggested that, either through a proliferation of signs or too much information on individual signs, on premise commercial signs can result in a phenomenon known as driver information overload."*

This fear and concern stands in stark contrast to the research on Signs and so-called "driver distraction" and accidents, which has repeatedly shown that Signs (including signs with EMCs) do not cause accidents. If signs are so confusing or distracting, one could rightly assume that accidents would occur regularly based on Driver Information Load. They in fact do not.

What do people do when Signs and DBB / EMCs are along the roadway? Mr. Garvey states*: "In summary, the research on driver attention to road signs indicates that too much information on individual on-premise commercial signs and/or too many of these signs in a given area may lead to drivers disregarding some signs (mainly irrelevant signs) or some information on the signs (typically secondary)."* In other words, people are not compelled to read the signs that do not contain vital information like directions, traffic directions and regulatory information, and they simply ignore the signs and the content therein because they have to attend to the primary task at hand, which is in fact operating a motor vehicle.

Next time one hears about the Zeigarnik Effect and DBB / EMCs, it will be useful to remember that the Zeigarnik Effect is a theory circa 1927 that involves memory, waiters and psychology, not Electronic Message Center signs in the modern driving environment.

8. The Wachtel Report & the VTTI 100-Car Naturalistic Driving Study

The 2009 NCHRP Wachtel Report places great emphasis on the quality of testing and results obtained in two companion documents on Drivers and Driver Inattention: (1) *The 100-Car Naturalistic Driving Study Phase II – Results of the 100-Car Field Experiment* and *The Impact of Driver Inattention On Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data.* Both were performed by the Virginia Tech Transportation Institute (VTTI) for the National Highway Traffic Safety Administration (NHTSA), and were released in April 2006. The 100-Car Naturalistic study was a comprehensive and in depth analysis of actual driving behaviors displayed by Drivers. The data analysis was thorough and exhaustive, and the Phase II report totals 894 pages.

These studies are included in this review of the 2009 NCHRP Wachtel Report because the methodology and results obtained in this VTTI research provide a vital ingredient to the Wachtel theory on DBB / EMCs and driver interaction: by a certain percentage, VTTI says that Drivers can have accidents when they are inattentive to the driving task for 2 seconds or longer.

The 100-Car Naturalistic Driving Study involved vehicles equipped with instruments designed to collect continuous data about the drivers over a one year period; 100 ordinary vehicles were used

in the study. The idea of the project was to study Driver Inattention, which was broken down into four types:

> *(1) secondary task distraction;*
> *(2) driving-related inattention to the forward roadway (e.g., blind spot checks);*
> *(3) moderate to extreme drowsiness;*
> *(4) other non-driving-related eyeglances, P Xxiii*

The VTTI authors also said this in the Executive Summary (emphasis added to key points):

> *Historically, driver distraction has typically been associated with secondary tasks such as dialing a cell phone, conversing with a passenger, and adjusting the radio. Driver distraction has been said to lead to driver inattention.*
>
> *The two new categories were "driving-related inattention to the forward roadway" and "nonspecific eyeglance." Driving-related inattention to the forward roadway involves the driver checking the speedometer, rear-view mirrors, or blind spots.*
>
> *The "nonspecific eyeglance away from the forward roadway" describes cases for which the driver briefly glances away from the roadway,* ***but at no discernable object or person****.*

The Reader should keep in mind that eyeglances away from the forward roadway in the Study did not involve signs of any kind. As one could guess, cell phones and related devices played the greatest role in events, crashes and collisions.

> *The use of hand-held wireless devices (primarily cell phones but including a small amount of PDA use) was associated with the highest frequency of secondary task distraction-related events. This was true for both events of lower severity (i.e., incidents) and for events of higher severity (i.e., near-crashes). Wireless devices were also among the categories associated with the highest frequencies of crashes and minor collisions, along with looking at/reaching for an object in vehicle and passenger-related secondary tasks. P xxiv*

Out of observations from 100 cars over a (1) year period, there were a total of 69 crashes, 761 near-crashes, and 8,295 incidents. Below is a table showing the context of the crashes in particular.

Table RO.3. Number of crashes, near-crashes, and incidents for each conflict type.

Conflict Type	Crash	Near-crash	Incident
Single vehicle	24	48	191
Lead vehicle	15	380	5783
Following vehicle	12	70	766
Object/obstacle	9	6	394
Parked vehicle	4	5	83
Animal	2	10	56
Vehicle turning across subject vehicle path in opposite direction	2	27	79
Adjacent vehicle	1	115	342
Other	0	2	13
Oncoming traffic	0	27	184
Vehicle turning across subject vehicle path in same direction	0	3	10
Vehicle turning into subject vehicle path in same direction	0	28	90
Vehicle turning into subject vehicle path in opposite direction	0	0	1
Vehicle moving across subject vehicle path through intersection	0	27	158
Merging vehicle	0	6	18
Pedestrian	0	6	108
Pedalcyclist	0	0	16
Unknown	0	1	3

Accidents had (a) Primary Factors or Precipitating Factors involved their occurrence, and then (b) Associated behavior or contributing factors were assigned to each occurrence.

> *Contributing factors were those factors that were judged by the trained data reductionists as directly influencing the presence or severity of a crash, near-crash, or incident. These contributing factors were further grouped into infrastructure/driving environment factors, driver factors, and vehicle factors.*

Because the data gathering was so accurate and in real time, the researchers were able to discern very fine differences in behaviors. Would the reader care to estimate how many times signs and Electronic signs were mentioned in the 100-Car Naturalistic study? That's correct: none.

It was in the context of Crashes, Near Crashes and Incidents that the matter of Glances was analyzed by VTTI. Drivers were engaged in glancing continuously. The VTTI report is very clear: the researchers did not identify signs or DBB / EMC signs as being involved in crashes nor can one assume that signs were involved in glances as an associated or contributing factor to crashes near crashes and incidents. The VTTI report does not give any evidence to suggest that glances at DBB / EMC signs should be considered as contributing or associated factors in crashes. In fact, not all glances for 2 seconds are longer are the same, involving the same focus, attention, or interaction on the part of the Driver.

Because researchers are not seeing DBB / EMC signs or signs of any kind being cited as the cause of accidents or as a contributing factor or an associated factor in accident studies and driver distraction issues, the assumption that the Wachtel report makes about eyeglances and DBB / EMC signs is not supported by the VTTI study.

Glances at signs and DBB / EMC signs that are operating in standard fashion (they are not flashing; the change rate is 6-8 seconds minimum; etc.) are the types of normal, common place

activities that licensed motorists engage in safely and routinely every day. Glances at signs for 2 seconds or longer may in fact be ordinary scanning and glancing behavior, safely performed on a regular basis, in conjunction with the safe operation of a motor vehicle.

9. VTTI'S Analysis of the 100-Car Naturalistic Driving Study

The Virginia Tech Transportation Institute (VTTI) published a companion document to the 100-Car Naturalistic Driving Study titled: *The Impact of Driver Inattention On Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data*. This analysis took the 100-Car data and refined it in order to address several key questions about Drivers and Driver Inattention.

A discussion of the VTTI analysis is included here because certain statements made in the analysis serve as an underpinning to the Wachtel theory that glances at DBB / EMCs cause accidents or will cause accidents or might cause accidents. The VTTI analysis has no direct relationship to signs or EMCs. The words/phrases "On Premise sign" or "outdoor advertising sign" or DBB or EMC or CEVMS do not appear in the analysis or in the main body of the 100-Car Naturalistic Study. Signs are never cited or noted as a cause or contributing factor to crashes or near crashes; the reader should be aware that a whole laundry list of items are cited as the cause or contributing factor to crashes or near crashes.

VTTI identified (4) main categories of distraction that surrounded or contributed to events that created crashes and near crashes:

> • *Secondary task distraction – driver behavior that diverts the driver's attention away from the driving task. This may include talking/listening to hand-held device, eating, talking to a passenger, etc.*
> • *Driving-related inattention to the forward roadway – driver behavior that is directly related to the driving task but diverts driver's attention away from the forward field of view. This includes …..drivers checking the speedometer, checking blind spots, observing adjacent traffic prior to or during a lane change, looking for a parking spot, and checking mirrors.*
> • *Drowsiness – driver behavior that includes eye closures, minimal body/eye movement, repeated yawning, and/or other behaviors based upon those defined by Wierwille and Ellsworth (1994).*
> • *Non-specific eyeglance away from the forward roadway – driver behavior that includes moments when the driver glances, usually momentarily, away from the roadway, but at no discernable object, person, or unknown location.*

The VTTI analysis was concerned about this last Inattention issue related to crashes / near crashes: *"eyes off forward roadway"*. And they noted *"the eyeglances away from the forward roadway greater than 2 seconds increase an individual's relative near-crash/crash risk by two times that of normal, baseline driving."*

This last quotation is important, as it provides one of the key elements in the Wachtel claim (and claims by others) that DBB / EMCs cause or will cause accidents. As discussed in NCHRP report document, Wachtel grafts two separate observations together to form his theory: eyeglances away from the roadway for longer than 2 seconds can be a contributor to accidents + studies show that some drivers view some EMCs for 2 seconds at a time or longer = EMCs are unsafe and need to be tightly regulated.

There are defects in this theory. Not all "eyeglances away for the roadway" are the same, or done for the same purpose, and the Wachtel theory glosses over or ignores these very real distinctions.

In fact, VTTI actually defined and grouped the locations where Drivers were glancing. They identified (14) major glance locations and then created (3) general groupings, or what they termed "ellipses".

> *The first group, called Ellipse 1, included all locations that were 20° or less away from center forward. Ellipse 2 included all locations that were up to 40° but greater than 20°. The last Ellipse includes all locations greater than 40° as well as hand-held device, object, and eyes closed. The eyeglance categories that were assigned to each ellipse are as follows:*
>
> *Ellipse 1: Left Forward, Right Forward, and Instrument Panel*
> *Ellipse 2: Center Mirror, Radio/HVAC, and Left Mirror*
> *Ellipse 3: Left Window, Right Mirror, Right Window, Passenger in Right-Hand Seat, Hand-Held Device, Object/Other, and Eyes Closed.*
>
> *Interesting results were also obtained when analyzing the location of the longest glance away from the forward roadway. Note that for crashes and near-crashes,* ***drivers were more far more frequently looking in Ellipse 2 than other locations.***

And finally VTTI said this about eyeglances, again emphasis added:

> *The analysis of eyeglance behavior indicates that total eyes-off-road durations of greater than 2 seconds significantly increased individual near-crash/crash risk; whereas eyeglance durations less than 2 seconds did not significantly increase risk relative to normal baseline driving.* ***The purpose behind an eyeglance away from the roadway is important to consider,*** *an eyeglance directed at a rear-view mirror is a safety-enhancing activity in the larger context of driving, while eyeglances at objects inside the vehicle are not safety-enhancing. P 118*

And VTTI noted this as well:

> *The total time eyes are away from the forward roadway may or may not be a source of potential inattention, depending upon the purpose for looking away.*

Under the Wachtel Theory, all glances from the roadway are the same – but this assumption runs counter to how Drivers operate a motor vehicle and scan the environment in the real world. Equating a glance at an DBB / EMC sign to operating a cell phone or texting while driving or adjusting the CD player or disciplining a child passenger or consuming food while driving or watching an animal run out into the roadway or seeing an accident or accident scene or hundreds of other daily occurrences that Drivers engage in or must contend with is not reasonable or correct. Drivers further must monitor the weather, environmental conditions, type of roadway they are on, the configuration of roadway (curves, inclines etc.) and their own drowsiness at times.

For a partial list of what Drivers were observed doing in their vehicles over the course of (1) Year, please see the VTTI Analysis report. Signs and DBB / EMC signs are not listed; they are not included in the various Driver Distraction reports that have been issued since 2000, the vast majority of which were conducted by major reputable Universities. There is reason why signs are not shown to be a cause or contributing factor to accidents in other Driver Distraction and Accident studies: they are not the cause or contributing factor to accidents. There were only 69 crashes observed in the entire VTTI 100-Car study; signs or EMC signs were involved in none. There were 761 Near Crashes observed; signs or DBB / EMC signs are not mentioned as the cause.

A powerful case can be made that if Drivers take their attention away from the forward roadway for 2 seconds or longer while engaging in certain kinds of behavior or activities, the risk of crash or near crash increases. That glancing at Signs or DBB / EMC signs is in any way the type of behavior or activity that constitutes "Inattention" or distraction is highly debatable, based on the VTTI research and the research of others.

And finally, if a DBB / EMC sign is properly located and is adjacent to the Highway or within the driver's Cone of Vision, then the Driver does not have to have Eyes off the Forward Highway, which further minimizes any issue with Driver eyeglances and EMCs.

10. Is there a linkage between Driver Distraction & DBB / EMCs?

A discussion of so-called "driver distraction" and DBB / EMCs is not merely limited to the 2009 Wachtel NCHRP report. Commentators and consultants outside the Wachtel report have suggested that EMCs are a distraction to Drivers, and in order to give credence to this concern, a form of the following chart or table is often cited This table or chart comes from a 2001 report titled *The Role of Driver Distraction in Traffic Crashes*, which was prepared by the Highway Safety Research Center at the University of North Carolina for the AAA Foundation for Traffic Safety, a non-profit research organization funded mainly by the AAA (American Automobile Association).

Using information derived from an analysis of approximately five years of the National Accident Sampling System (NASS) Crashworthiness Data System (CDS) data, the UNC researchers offered this table to describe the types and percentages of Driver Distraction in police-reported accidents:

The specific sources of distraction among distracted drivers were:

Specific Distraction	% of Drivers
Outside person, object or event	29.4
Adjusting radio, cassette, CD	11.4
Other occupant in vehicle	10.9
Moving object in vehicle	4.3
Other device/object brought into vehicle	2.9
Adjusting vehicle/climate controls	2.8
Eating or drinking	1.7
Using/dialing cell phone	1.5
Smoking related	0.9
Other distraction	25.6
Unknown distraction	8.6
	100.0

First, the assumption is made that a "driver distraction" is considered a time when the Driver takes his or her eyes off the road for 2 seconds or more, or is unable to safely operate a motor vehicle for some other reason.

Some have pointed to this summary of driver distractions and highlighted the first entry - *Outside person, object or event 29.4 %* - and then claimed that DBB / EMCs fit within the listing "Outside person, object or event" and therefore are a distraction for Drivers that causes accidents; it is reasoned that a DBB / EMC displaying messages that may change every 8-10 seconds is an "event" or "object" that is outside the vehicle. But is this reasoning substantiated?

(A) There have been numerous Driver behavior / Driver Distraction studies over time, and signs in general are never reported as a distraction or cause for an accident in any of these reports; if signs or EMCs are not named, you cannot factually assume or imply that they were named.

(B) More specifically, what is a "Outside person, object or event" in these Driver Distraction / accident studies? How is this listing defined? Or can anything be implied into this category? Is it fair to imply that EMC signs or DBB fit within the responses given by Drivers? The AAA Foundation study gives further guidance by providing actual examples and definitions from the actual accident reports:

Outside person, Object or Event	
Outside traffic/vehicle	(vehicle swerved, turned in front of, changed lanes, slowed or stopped, encroached on lane, emergency vehicle, bright vehicle lights, etc.)
	Police (being chased by police, officer directing traffic, thought saw police, police NOS 2)
Animal in roadway	(deer, dog, elk, animal NOS)
Sunlight, sunset	

People/objects in roadway	(child in road, basketball game, crowd, broken glass, garbage can, etc.)
Crash scene/leaving scene of crash	
Road construction	
Other	(waved ahead by driver, another person or driver, parachutes in sky, bicycle, toll booth, brush obstructing vision, tire blowout, etc.
Outside object, person or event NOS	

Apparently, in a large percentage of the cases (43%), there was no additional information to clarify the nature of the distraction. These cases were then recorded as "NOS" or "not otherwise specified" (for example, "outside object, person or event NOS").

However, if one is patient enough to delve a bit deeper, in many instances studies reveal further details, and an attempt can be made to define this NOS category/entry; items in this category can include:

> *waving or talking to someone outside the vehicle, looking at houses or pretty scenery, toll booths, drive-through windows at banks or fast-food restaurants, work zone activity, simply looking out the side window at something, bright sun / sun glare, pedestrians, and children along road not in road*

Based on this additional information, it appears that the entry listing *"Outside objects, persons, or events"* is not intended as a grab-bag potpourri category into which anything can be implied. And again it is obvious that signs and EMC signs are never cited as a distraction leading to or causing accidents. To be clear, the issue is not whether Drivers are looking at DBB / EMC signs, but whether Drivers are looking at DBB / EMC signs and having accidents or crashes. Somewhere in the known world - based on actual research or field studies - not theoretical suggestions – a demonstration is needed showing that DBB / EMC signs do have an impact on actual driver performance and create accidents or crashes. Based upon all the available Driver Distraction data available at this time, apparently they do not.

11. Driver Distraction Model - outdated as related to Signs

Researchers in the field of traffic safety, transportation and human factors research have espoused a model of explaining Driver behavior and Driver needs that centers on minimizing or removing "Driver Distractions". This has been the Orthodoxy, for decades. The word "distraction" in and of itself is a pejorative term, as it imparts a negative meaning to anything it describes or is connected with. Dictionaries often define distraction as follows:

> *Definition: Distraction*
>
> *1. something that diverts attention: something that interferes with concentration or takes attention away from something else*

Signs are often termed “distractions” by researchers, as in items or activities that should be limited or curtailed because they may take the Driver’s attention away from the immediate task at hand i.e. operating a motor vehicle.

However, a fair distinction needs to be made between normal activities engaged in while operating a motor vehicle and bona fide “distractions” to the Driver that cause traffic accidents. To put it another way, there may be many things that Drivers do or observe while driving or in addition to driving, but they all do not cause traffic accidents. Not all “distractions” are created equal.

Signs are often cited as distractions, or having the potential to distract Drivers. This is repeated from local Sign Code to local Sign Code, in planning meetings, town councils and boards of review. The question should not be, however, are signs a driver distraction, but rather are signs the type of “distraction” that causes Drivers to have traffic accidents?

It’s interesting to note that, over all of the decades that the Driver Distraction model has been in place, no one has ever demonstrated empirically that signs cause accidents. This certainly has presented a quandary for traffic researchers – everyone thinks there is something there, but proof appears to be lacking. And that is the central point here – no one has ever demonstrated that signs cause accidents, despite the fact that the mantra of driver distraction has been recited over and over in a multitude of contexts.

It is clearly one thing to show that Drivers look at an item along the roadway, perhaps even for 2 seconds or longer, and it is quite another matter to show that the Driver’s observation or “glance” causes or contributes to a traffic accident.

Like a dog on leash in the backyard, barking at everything in sight, so too is the language connected with DBB / EMC signs and “distractions”. In this example, the dog does not discriminate, he barks at everything (everything is a distraction and gets a bark). The dog does not differentiate between what gets a bark – a butterfly, the neighbor’s dog, kids playing, a car passing by, or an intruder hopping the fence.

As in this example, so too with driver “distractions”; the theory is that Drivers are compelled to look at all “distractions” and cannot exercise any control over this behavior. Yet one can make a long list of items that Drivers look at or activities that they engage in while driving, and the real way we can differentiate or discriminate between these “distractions” is by looking at hard evidence of the results; there is no other objective way or impartial way to approach the issue.

For example, in 2003, the United States Sign Council Foundation funded a study focused on this very point: Do signs cause accidents? A Two Phase study was completed titled: *Traffic Safety Study – An Examination of the Relationship Between Signs and Traffic Safety* by Tantala Associates, an engineering firm located in Philadelphia PA.

Part One of the Tantala Study involved an examination of accident data covering the entire length of the New Jersey Turnpike (4 years of data) and an integration of this data with every

sign located along the NJ Turnpike. Based upon statistical analysis, it was found that signs did not cause accidents along the roadway (no statistical or causal relationship).

Part Two involved the examination of accident data at a particular geographic location, before and after a sign was installed. In this case, a busy intersection in suburban Philadelphia where a Freestanding On Premise sign was installed, that also happened to include an EMC sign. The researchers found that *"After the installation of a specific, roadside sign at a Pennsylvania intersection, the traffic volume increased, the APV (accident rate) decreased, the maximum number of accidents in any given day or week decreased and increased."* That is, the accident rate decreased, despite the installation of an EMC sign.

12. Eye Movement Studies & the 2009 NCHRP Wachtel Report

What did the Eye Movement studies cited by the 2009 NCHRP Wachtel Report say in regard to DBB / EMC signs? Was anything conclusive?

(A) In the 2004 Toronto Study *Observed Driver Glance Behavior at Roadside Advertising Sign* by Daan Beijer, Alison Smiley, and Moshe Eizenman (also discussed in the 2009 NCHRP Wachtel Report), the authors stated that the "purpose of this study was to determine the possible distracting effect of roadside advertisements next to a major expressway on driver scanning behavior".

What can be gleaned from the 2004 study conducted in Toronto?

- all the drivers looked at the signs along the roadway
- no accidents occurred
- average Glance Duration was .57 seconds
- Roller bar type signs and active EMCs received the longest glances, over .57 seconds
- active signs (EMCs, trivision signs etc) received more glances than static signs
- sign location or sign placement can play an active part in whether a driver glances/looks at a particular sign; it is easier to perform a glance if the sign is within or close to the Driver's 10 degree Central Field of View,. This finding illustrates the age-old dilemma of sign placement: it is easier and safer for sign messages to be placed close to the Driver's FOV (no awkward glancing, no turning of head etc), yet many municipalities and governmental organizations yearn to push all signage as far away from the roadway as possible, far from the driver's FOV (perhaps with even with the artful addition of obscuring landscaping and plantings).

The Toronto authors state (emphasis added):

> *The results of the AGD (Average Glance Duration) data indicate that, on average, the subjects were not willing to shift attention away from the road for longer than a set period of time; and this period of time was consistent between subjects, sign features, and traffic conditions. This is consistent with the research of Rockwell (2) and Zwahlen (7). Therefore, sign features or other external variables appeared to have a* ***marginal influence*** *on AGD*

And they further state:

> *The maximum glance duration denotes the longest time that a driver is willing to spend on a single sign or class of signs. At least 88% of the subjects glanced at one or more signs for ≥0.75 s, and 20% glanced at least one or more signs for more than 2 s. However, these long glances accounted for only 22% of the total glances. This indicates that subjects are willing to take longer glances at some signs, but for the majority of the time, driving conditions do not permit longer glances or the sign itself does not warrant longer glances.*

Why does this type of research not "prove the claim" as it were? Because demonstrating that drivers look at DBB / EMCs on Federal Highways, and glance at them for sometimes 2 seconds or longer, does not by itself connect you to the next critical link that the 2009 NCHRP Wachtel Report wants you to follow.

And when the Toronto researchers went back to examine or correlate their findings with actual traffic accident data from the signs and sites studied, was a connection found? In other words, were the areas where the test subjects glanced at EMC signs higher accident areas? Answer: no (there was one site that was questionable, but all the circumstances were not known).

(B) The 2009 NCHRP Wachtel Report discusses a second Toronto study titled: *Impact of Video Advertising on Driver Fixation Patterns* by Alison Smiley, Thomas Smahel, and Moshe Eizenman, 2004. This study measured Driver eye movement reaction to "video" EMCs on downtown streets / urban environment (plus all other signage) using an Eye Movement Recording System.

Much discussion is included about length of glances. In this case, greater than .75 seconds raises questions for the researchers and Mr. Wachtel. In other reports and reviews, this is considered a low threshold and glances at or greater than 2 seconds are deemed to be a problem.

The 2009 NCHRP Wachtel Report fails to mention that average glance duration involving "video" billboards in this Toronto Study was less than .58 seconds, and glances at billboards in general was lower. In addition, many researchers consider a .75 second glance as a low threshold, not cause for alarm, based on Driver performance.

The Toronto researchers discovered the following, which is extremely relevant to evaluating Driver performance in the presence of EMC signs with video:

> ***"****A statistical analysis comparing glances at traffic signs and signals did not show any change in the percentage of such glances or the percentage of time spent glancing on the video sign approach compared with the percentages on the nonvideo sign approach."*

In other words, Video signs or no video signs, there was no change by Drivers in the viewing/reading of traffic signs and signals. If one wishes to advance a theory of "driver distraction" and DBB / EMCs, one should have evidence that DBB / EMCs reduce the amount of time that Drivers devote to viewing or glancing at traffic signs and signals.

(C) Finally, in *Traffic Safety Evaluation of Video Advertising Signs* by Alison Smiley, Bhagwant Persaud, Geni Bahar, Calvin Mollett, Craig Lyon, Thomas Smahel, and W. Leslie Kelman, 2005, the Toronto team examined five areas where DBB / EMCs were located at the request of the City of Toronto. Again, this was an "eye movement" study using test participants in vehicles equipped with Eye Movement Recorders:

Study 1, eye fixation
Study 2, conflicts
Study 3, headways and speeds
Study 4, crashes
Study 5, public survey

In the end, the Toronto authors state unequivocally, when comparing collisions at the studied intersections, before and after the installation of the Video signs:

"Overall, there was no effect on total collisions (0.6% increase on video approaches)."

"…total collision frequency remained unchanged and there was a negligible increase in injury collision frequencies on the video approach"

The 2009 NCHRP Wachtel Report does go out of its way to dispute and qualify the results of this Toronto collision data comparison, as if it was more important or significant to consider the potential occurrence of collisions based on glance theory over the actual results obtained from looking at objective numbers. If that is case - if the theoretical chance of collisions is most important - then most Americans best not get out of bed tomorrow and drive out of their driveways, because they can expect to be involved in an accident, theoretically speaking.

13. Drivers and Scanning Behavior

So what exactly explains the way that Drivers interact with the roadway environment, signs and DBB / EMC signs, if the "distraction" model does not fit?

The following will be a brief description of a Driver scanning and information acquisition model. It will be presented in narrative form. It is a paradigm that helps explain why, whenever signs are examined in regard to distractions and traffic accidents, the research does not appear to find a connection. The fact remains that many seem to be looking for a clear link between traffic accidents and DBB / EMCs, and are unable to demonstrate one.

(A) The average Driver has learned a set of skills that allows the Driver to operate a motor vehicle safely in the real world environment.

(B) Drivers take in, absorb, and process thousands and even millions of bits of information as they operate their motor vehicles, each and every second. Drivers do many things consciously, and many things without clear directive thinking.

(C) In terms of the outside visual environment (outside the vehicle), the details that a Driver can process, and yet at the same time operate a vehicle safely, is amazing. Setting aside issues that occur inside the vehicle (instruments, temperature etc.), a Driver encounters a visual snapshot, directly ahead, that is constantly changing, at different distances from the Driver and at different speeds, during each and every second of the driving task.

We see the road ahead, the cars ahead, the cars passing in the opposite direction, we are aware of the posted speed, we are aware of the speed that traffic allows, we look for objects in the roadway, we monitor traffic and regulatory signs, we see makes and models of vehicles, we see the landscape, we see buildings, we either know our route or must navigate with directions – the list is endless and each one of these items consists of thousands of bits of information that make up the image, that is constantly changing as we proceed down the roadway. We can also safely focus on specific individual items – a vista, a tree, a sunset, a pedestrian walking by, a new store, a flower, a specific animal, etc – for brief moments and still maintain proper control of our vehicles.

(D) It is in this context that signs and DBB / EMC signs exist. The fact that a sign is adjacent to a roadway does not cause a Driver to drive off the road. Multiplying this scenario, the fact that there are multiple signs along a roadway, or multiple signs with large amounts of information along a roadway, or very large signs along a roadway, or signs spaced close together, does not cause a Driver to lose control of his or her motor vehicle. Some may be worried about these situations, but the fact remains (based on accident and distraction studies), Drivers are not having accidents because of signs, including DBB / EMC signs.

Signs are not the straw that breaks the Camel's back, based upon the evidence. Signs merely represent just one more grouping of information that a Driver processes as he or she operates a motor vehicle, nothing more. There is not "information load" or "overload" or "distraction" or any of the other pejorative terms applied to signs and DBB / EMCs. The ability of humans to acquire visual information while driving is immense. Actual physical activities that Drivers may engage in – cell phone use, texting, eating, operating a GPS or other technological device – are another story entirely, and are addressed in the Accident / Driver Distraction studies currently available.

14. Review of Section 6 of the Wachtel Report: Recommendations

In Section 6 of the 2009 NCHRP Report, Mr. Wachtel provides his "Recommendations for Guidelines" wherein he discusses recommendations going forward for EMC operation when they are used on Billboards (DBB). To be clear, the 2009 NCHRP Report is now addressing the operation of EMCs when they are used as Outdoor Advertising signs or DBB or Billboards along Federally funded and/or State Highways (and not On Premise signs). The 2009 NCHRP Report recommendations highlight several main issues related to DBB / EMCs. Below will be a discussion of the areas where the Guidelines may exceed the objective data presented or may be incorrect or misguided in some assumption or finding.

Mr. Wachtel recognizes in this Section that there is not currently comprehensive research to provide answers for guidance in creating regulations. He again however insists that research conducted over approximately a 10 year period (1999-2009) *"has quite consistently demonstrated empirical concern about driver distraction from roadside billboards".*

Minimum Message Display Duration

This operational aspect of a Digital Billboard is also referred to, in the industry, as Change Rate or Dwell Time. This is the amount of time that a message is displayed on the DBB / EMC Sign itself, before a change to the next message. Sign Owners and regulators often talk about the allowable "change rate"; at what frequency can the message or communication be changed? And, Mr. Wachtel states very clearly on page 145:

> *We are not aware of any research that has been conducted on the effects on distraction of the duration of time that a message on a DBB remains visible before changing to the next message.*

First, as noted previously, this statement presupposes the validity of the Driver Distraction "world view", describing how Drivers interact with their driving environment, and that view does not necessarily comport with the research on Drivers and "driver distraction". When one considers all the Driver Distraction research that has been conducted, and in fact is currently being conducted, and Accident research on Driver Distraction, one can see that the change rate on a Digital Billboard (DBB) is not a factor in Driver Distraction related to accidents or near accidents.

Between the Federal Highway Administration (FHWA) and many State DOTs, the accepted change rate (or Message On-Time) is in the range of 5-8 seconds. The International Code Council (ICC), the national association of Building Officials, whose primary job is to protect public safety through a variety of national model codes, calls for a Change Rate of every 5 seconds (IZC Chapter 10 page 29). The Wachtel report also says:

> *"To our knowledge there is no empirical basis for any of these recommended or required display intervals."*

This statement is true, but couched in the negative, for reasons that become apparent shortly. A better way to state this proposition would have been: ***there is no research that shows that the length of Change Rate has a negative affect or positive effect on Drivers or creates Driver Distraction*.**

The 2009 NCHRP Report then goes into a discussion of reasons for suggesting a longer Change Rate, tied to the distance that a driver can see the sign. Reasons are: (1) DBBs often have bright lights (as compared to their surroundings) and therefore a Driver's eyes might be drawn to the DBBs at night; (2) the dangers of the "Zeigarnik Effect" (please see an examination of the Zeigarnik Effect in this review). As a consequence, the 2009 NCHRP Report suggests tying the Change Rate to the distance that the Driver can see the sign from and the speed of traffic. For instance, if a DBB can be seen from 1000' at night and the posted speed is 55 MPH, then the

allowable change rate would be 12.36 seconds (minimum display duration - MDD); that's 1000' divided by the Feet per Second traveled. If this all sounds reasonable; well, there are problems lurking beneath this reasonable approach.

In 1980, Mr. Wachtel proposed a 15 second change rate; today he suggests a sliding scale, but with the same basic result – or even longer dwell times - yet he also admits there is no research that demonstrates that any change rate is an issue for Drivers.

The 2009 NCHRP Report's "Sight distance to the DBB" is not clearly defined. "Sight Distance to the DBB" will be potentially a very large distance, based on a review of Mr. Wachtel's overall work product. In his view, one does not focus on the more practical distance from which a Motorist can comfortably detect and read the DBB; instead one generally goes to the outermost limits of where a Motorist could possibly or even hypothetically see an illuminated DBB at night from down the highway and call that the "Sight distance to the DBB". The Motorist really can't read the DBB or understand the graphics at this distance. So, instead of a Sight distance to the DBB of 800' – 1200', which would be quite normal along a highway, one will be confronted with Sight Distances of 1500'-3000' in many cases. And these distances will require much longer Change Rates or Message On-Times due to the formula proposed by Mr. Wachtel, in spite of the fact that there is no evidence suggesting a need for a longer change rate.

On the practical side of things, in the real world of sign permits and sign operation, who would be charged with determining the correct or official Sight Distance to Display number in any given jurisdiction? Who would be even qualified to make this determination? Will there be a need for additional governmental or agency or local committee review, replete with Hearings, Applications, Fees, and experts to be hired by the applicant to justify whatever change rate is proposed or is being challenged? These additional questions deserve careful review.

Message Sequencing

Mr. Wachtel is also concerned about Outdoor companies spreading a message along a highway by using two or more DBBs in succession. The old Burma Shave scenario is referenced, as it was in the1980 FHWA report, complete with another mention of the dreaded Zeigarnik Effect. Mr. Wachtel recommends prohibiting attempts to create Message Sequencing. In reality, this rarely if ever occurs along our federally-funded highways due to individual State Department of Transportation regulations in conjunction with FHWA guidelines, in addition to the effect of market forces (digital signs have such a high cost that multiple electronic signs in one geographic location makes little if any economic sense, if not being cost prohibitive).

Secondly, in most states, Billboards that have EMCs have minimum spacing or distance requirements; the EMCs can't be immediately adjacent to one another by regulation of the DOTs.

Third, there is no empirical basis for the recommendation – this so-called message sequencing, if it is occurring in the field, is not apparently causing accidents or causing Motorists so much distraction that their driving is affected negatively in any measureable way.

Amount of Information Displayed

The 2009 NCHRP Report also expresses concern over the amount of information that can be potentially displayed on a DBB. The concern here is that a more lengthy or complex message will take a Motorist longer to read.

The reason why Motorists do not appear to be affected by the amount of copy on a sign or the number of signs along a given roadway was discussed earlier and has been thoroughly discussed elsewhere: the Motorist, when confronted by a large amount of information that he or she cannot read under current conditions, simply ignores the sign/information and attends to the primary task at hand, which is operating the motor vehicle.

The reader should also remember these two true statements made by Mr. Wachtel in this section:

> *"To our knowledge, no US jurisdiction places restrictions on the amount of information that may be presented on billboards, including DBBs."*
>
> *"While it is not be (sic) within the power of any government agency or road operating authority in the US to dictate the type or nature of display content or presentation,…."*

If a government agency or road operating authority were to try to limit the "information" on a DBB or sign, they would indeed need a very compelling scientific reason for this censorship, under the protections afforded speech under the First Amendment. The Wachtel report offers nothing concrete in this regard.

Brightness, Luminance and Illuminance

The brightness of a Digital Billboard at night is clearly an issue for Motorists and regulators. DBBs have to achieve a certain brightness level during the day so that the sign message can be seen and read; the sun, ambient light levels and even reflection all contribute to the need for brightness during the day. However, it is recognized by all concerned – the manufacturers, the Outdoor companies, and regulators –that DBBs need to be dimmed at night.

Mr. Wachtel engages in a lengthy discussion of brightness, luminance and illuminance as applied to signs in this section.

All stakeholders having interest in the subject of Electronic signs and billboards agree that Digital Billboards and signs need to be dimmed at night; there is no controversy here. Secondly, there is also no evidence that Electronic signs create any issues related to sign Illuminance or what is commonly referred to as "light trespass", so the mention of "Illuminance" is misplaced in the report.

From a practical perspective, rather than have regulators or sign companies (or paid lighting consultants) from the across the country running out into the field with their light meters in hand, ready to take individual light measurements, the better course will be to simply require DBB dimming at night uniformly. This would involve the manufacturers of these units providing data

on their signs, and equipping their EMC units with dimming capability, which most reputable EMC manufacturers already do. This would also add only one more item to an administrative review of an otherwise compliant Sign Permit application for a Digital Billboard, and would not be burdensome in terms of bureaucracy, but would address the issue directly.

Other Issues and Recommendations

Other issues related to DBB Guidelines contained in this section are non-controversial or are already determined by governmental regulation – DBB Size; Information Presentation on DBBs; the spacing of DBB along the Highway and other issues.

15. Review of SECTION 7 of the Wachtel Report: On Premise Signs

The subject matter of this Section in the 2009 NCHRP Report - On Premise Signs - is completely outside the scope of the NCHRP report request, and generally has been outside the direct jurisdiction of the FHWA, by exemption and amendment to US Statutes. The 2009 NCHRP Report Section 7 says:

> *On-premise signs, those that advertise products or services that are available on the property on which the sign is located;*

It should be noted that the primary function of an On Premise sign is Identification, not advertising.

> *Traditionally, outdoor advertising signs refer to billboards, also known as off-premise signs.*

This tradition, and the legal definitions, has not changed.

EMC Cost

> *In addition, as the cost of LED display technology comes down,…….*

The 2009 Wachtel NCHRP report is uninformed in this area. The cost of the technology, from reputable established manufacturers based in the US, is not coming down, to any great degree. The quality of the technology and the images and the appearance of the messages are improving year by year; this is true. But on the basis of this statement, the Wachtel report could possibly create the mistaken impression that there is a pending flood of new EMCs coming to a roadway near you based on cheap cost, which is not the case.

Local Sign Codes

> *On-premise sign regulation is typically accomplished through local zoning codes, and may, in general, be far more variable and likely less stringent with regard to the means of the display, display characteristics, or the size of the sign than comparable*

controls on billboards. Many such codes have changed little in recent years, despite the growth of digital technology for on-premise displays.

The 2009 Wachtel NCHRP report is uninformed in this area. In year 2009, most local codes in urban and suburban areas already address the issue of EMCs and DBB and their operation and use. And in communities where the local code is older, the DBB / EMC issue is being addressed using existing language, or plans are underway to amend the code to account for DBB / EMC technology. On Premise EMC size is almost **always** dramatically smaller when compared to Off Premise Billboards EMC size..

Local Code Dimensional and Location issues

From the traffic safety perspective, it is possible that the risk of driver inattention and distraction is higher for some on-premise signs than for some DBBs, because on-premise signs may be larger and closer to the road, mounted at elevations closer to the approaching driver's eye level, and placed at angles that may require excessive head movements,.....

The 2009 Wachtel NCHRP report is uninformed in this area and misstates the facts. 99.9% of all Sign Codes in the US will not permit a sign, let alone a sign with an EMC display, that even remotely approaches the size of the standard 14'-0" x 48'-0" Billboard size (672 Square Feet in area). The regulatory climate in the US regarding On Premise signs is well known, and anyone familiar with On and Off Premise sign regulation would be aware of this fact – that the permitted size of On Premise signs is almost always a fraction of the size of a permitted Billboard or DBB or Off Premise sign.

On Premise Freestanding signs (signs not attached to a building) are typically installed immediately adjacent to the street or roadway, based on the local setback requirements and Right of Way rules in the given jurisdiction. This is the most appropriate and safest location for a Freestanding sign for identification purposes, as it places the sign message within the Motorists so-called "cone of vision", where the sign is placed in the Motorists central field of vision. If Freestanding signs with EMCs are placed at poor angles, requiring head movements, this becomes a defect in the local Code that needs correction.

In fact, one of the primary reasons On Premise Freestanding signs are located along the roadway is that they display information that the Driver needs to navigate or "wayfind". As opposed to a Billboard or DBB or Off Premise sign, a Driver needs to detect and read an On Premise sign message and then execute a driving maneuver – slow down, put on turn signal, change lanes, turn into a driveway etc. The Driver viewing a Billboard or DBB or Off Premise sign merely detects and reads the sign, if conditions permit, and then does nothing else – no turn or decision is required – the Driver merely continues on driving. At best, Billboard signs require only a "post sign maneuver", where the Driver performs a driving maneuver based on the message on the Billboard, several miles down the roadway, and not at or before the sign.

Call for more stringent On Premise EMC regulation

> *Of all of the guidelines proposed in this report for DBBs, there may well be an equal or greater need to consider similar controls for on-premise signs.*

The 2009 Wachtel NCHRP report gives no direct scientific basis for this suggestion; the report conclusions regarding DBB / Off Premise EMCs are based on theory and an admitted lack of direct evidence, and attempt to discount any evidence to the contrary.

16. Review of Section 8 of the Wachtel Report – New Technology, New Applications, New Challenges

The reader should note that much of Chapter 8 falls outside the stated mission of the 2009 NCHRP Wachtel Report. Mr. Wachtel states that he has learned of new features of Electronic signs, which are outside the purview of the NCHRP report, and then offers insights on a series of possible new applications for Electronic LED sign technology and his concerns

> *Although some of these applications fall outside the charter of this project, this report would be incomplete without mention of them. In most cases these new technologies and new applications are not addressed in Federal or local regulations and guidance; in some, regulations have already been imposed to address them. In a third category, some new developments appear to be in direct conflict with existing regulations or guidance. This chapter, although not contemplated when this project was initiated, will provide a brief overview of these new technologies and applications.*

These applications include:

- EMC signs having Audio; (prohibited in most jurisdictions)
- EMC signs mounted on vehicles and trucks; the so-called Mobile Billboards;
- inter-active signs.
- Data Collection from vehicles that pass by
- vandalism and Electronic signs being “hacked”

Mobile “Billboards”
The issue of advertisements or signs applied to vehicles that continuously move on public streets and roadways is a unique area of the law, and not settled. Are these “signs” controlled by local Code? Because the messages are applied to vehicles that move, and are not stationary, does the local municipality have any jurisdiction? Are these vehicles governed solely by the Department of Motor Vehicles in the individual state? The individual state DMV would appear to have the sole responsibility to regulate and license any such vehicle, but again this is an uncertain area of the law regarding signs.

In fact, the 2009 NCHRP Report then performs a logical jiu-jitsu, inserting this declaration with only a footnote for support:

> *Although we are unaware of any research that has been conducted to evaluate these mobile display units, it would seem that the potential for driver distraction from the use of this technology within the traffic stream is quite high,……*

Reliance on the statement "it would seem" gives a weak foundation to the assertion implied.

Inter-active Technology
Except in very rare and specialized circumstances, inter-active technology is not being used in On Premise sign EMC applications; it's just not a practical application when messages may only be seen for 2-10 seconds. Even Off Premise applications are very rare, and the appropriateness of this technique would be more site specific than generalized to all locations.

Data Collection
Issues regarding Data Collection are misplaced in the NCHRP report; what the 2009 NCHRP Report describes is no more of a concern that the latest GPS and DVD technology available in most new cars.

Vandalism
Hacking into Electronic sign systems is noted. This idea is as old as the neighborhood kids creatively re-arranging the letters on a changeable letter sign at the local Church or school. Were church sign message Boards therefore prohibited? Hacking is a law enforcement matter and an act of vandalism, not grounds for suggesting that these problems are traffic safety issues to be contained in an official report for the NCHRP.

17. Review of Section 9 of the Wachtel Report: Summary & Conclusions

In Section 9 of the 2009 NCHRP Wachtel report restates many of the claims advanced in the body of the report. The "Summary & Conclusions" should be differentiated from the actual "Recommendations" section of the report, which were much more limited, as they were constrained by the actual research available on DDBs and EMCs, and not the author's extrapolations and analogies, based on his own private conclusions, much of which were apparently formed over 30 years ago.

In this regard, the 2009 NCHRP Wachtel Report appears to be fighting an uphill battle on several key points. It is fighting *Occam's Razor* in particular. *Occam's Razor* is both a scientific principle and historic philosophical tenet that has relevance to the entire subject matter of DBB, EMC signs, traffic safety, accidents, the 2009 NCHRP Wachtel report, and research on DBB / EMC signs.

Occam's Razor can be stated as follows (the text and meaning have evolved over the years):

> *Of two equivalent theories or explanations, all other things being equal, the simpler one is to be preferred.*

Further comments on *Occam's Razor*:

> *When competing hypotheses are generally equal, Occam's Razor recommends selection of the hypothesis that introduces the fewest assumptions while still adequately answering the question.*

On the one hand, the 2009 NCHRP Wachtel Report has advanced a theory that DBB / EMCs are dangerous from a traffic safety perspective, and ought to be more tightly regulated in the future. The Wachtel Report Theory is complicated and attempts to join findings from unrelated Research to address the wholly separate issue of DBB / EMC signs. There is no primary research on or direct proof of the theory.

On the other hand, rightly or wrongly, others have claimed that there does not appear to be an issue here with DBB / EMCs and traffic accidents and/or crashes, if one considers the actual research on EMCs, accidents and Driver Distractions, because no linkage has ever been found. And this is by far the simpler theory. In fact, the "competing hypotheses" are not generally equal, as Mr. Wachtel can offer no research to back up his theory.

The 2009 NCHRP Wachtel Report offers a great deal of analysis of research reviews, reports, and studies to support the theory that DBB / EMCs are distracting for Drivers. At best, the 2009 NCHRP Wachtel Report can point to various studies that show that Drivers look at DBB / EMCs for longer periods of time. Some of these periods, creating so-called Driver Inattention, approach 2 seconds in length; as a footnote to this discussion, these 2 second intervals constitute what is commonly known as a "glance", and traffic researchers have known about the "glance rate" phenomenon for many years; in other words, that Drivers engage in "glances" and longer glances is already a known fact.

This scenario (Drivers looking at DBB / EMCs) can be demonstrated over and over scientifically, and there will not be much debate about this sequence of events. Drivers often look at DBB / EMCs, period.

However, that is the end of the factual basis for the theory advanced by the Wachtel report.

The rest of the basis for the Theory (that the risk of accidents increases when Driver Inattention is 2 seconds or longer and Drivers sometimes look at DBB / EMCs for 2 seconds) requires a circumstantial leap of faith on the part of the reader; it requires that inferences and analogies be accepted; and excuses for lack of proof have to be embraced; otherwise, the Wachtel Theory fails.

At the end of the day, as per *Occam's Razor*, a linkage has to be demonstrated between EMCs and traffic safety / accidents / crashes. We live in a society that accepts the principles contained in the Scientific Method. Researchers in all fields live by and apply these principles in their endeavors. The Scientific Method is a means by which an inquiry is based on gathering objective observable and measurable evidence. One starts with a hypothesis and proposed conclusion, an objective method of testing the hypothesis is engaged that can be duplicated, the

data is obtained, and then conclusions are drawn as to whether they hypothesis was in fact correct.

Fact: studies involving traffic accidents, traffic safety, real world analysis of traffic data, crash analysis, Driver distraction and Driver inattention analysis all are indicating that EMC signs play no part in so-called driver distraction resulting in accidents or accidents of any kind. The 2009 NCHRP Wachtel Report refuses accept this fact, yet this is the simplest conclusion based on the evidence, as per *Occam's Razor*.

Instead, Mr. Wachtel invites the reader to take a circuitous path around existing studies on DBB / EMCs and traffic accidents and Driver Distractions, to avoid this information, in order to reach another plateau where the studies are immaterial and a construct based on theoretical conclusions serves as proof of the hypothesis.

In regard to proof, the Wachtel Report issues itself a pass on the whole idea of studying DBB / EMCs and attempting to "prove" the hypothesis, though this is a hypothesis that state and local regulatory agencies are encouraged to adopt. In a professional document, it is surprising to see that requirement of proof so discounted:

> *Nonetheless, it is difficult if not impossible to design and conduct a research study whose results can be applied with confidence to DBBs as a whole. P 178*
>
> *In short, the issue of the role of DBBs in traffic safety is extremely complex, and there is no single research study approach that can provide answers to all of the many questions that must be raised in looking at this issue. P 179*
>
> *…we believe that it is unlikely that any agency, private organization, or public-private partnership will have the resources available in the foreseeable future to undertake such a study. P 178*

To the last quotation, is the reader then to conclude that money is all that is standing between the 2009 NCHRP Wachtel Report and proof of its theories? Is it so certain that the already existing results of work performed by other professionals, in this same field, would be shown to be in error or false? Does the reader have to accept the conclusion that, if not for the almighty dollar, Mr. Wachtel would have the proof that any scientist would require?

At the end of Section 9, the 2009 NCHRP Wachtel Report regurgitates the snippets of findings from studies over the past ten years that it has attempted to sew together into a rough hewn quilt of conjecture as "we now know this" and "we know that", thereby creating a bubbling brew of justification for DBB / EMC control beyond the current Guidelines approved by the FHWA.

Then, as a respected researcher, Mr. Wachtel posits these gems:

> *If crash causation is the standard that must be met, we may never get there. P 182*

This is not necessarily because DBBs are not a causative factor in crashes; it is, as most researchers believe, more likely that our research methods are not sufficiently sensitive to identify this linkage.

So, the reader is left to ponder these items:

1. DBB / EMC signs have not been found to be a causative factor in crashes.

2. But researchers, despite this evidence, believe DDB / EMC signs cause accidents because:

a. "our" research methods are not sensitive enough to find the linkage;
b. the issue (of EMCs and causation) is complex and those pesky post-hoc accident analyses studies are just so difficult to execute properly;
c. 80% of accidents are not reported to the police, so we must be missing some data; (Although this again is a bizarre statement to make, as any crash along a highway where a DBB is located would be hard to hide or not report, given the type of roadway involved, congested traffic, witnesses, police officers regularly on patrol etc);
d. Drivers in accidents will not admit to having been distracted by a DBB (though they interestingly do seem willing to admit to a very long list of other very incriminating activities and distractions);
e. Drivers eyes are drawn toward DBB even if the Driver does not want to look;
f. and finally, the *coup de grace* – Drivers look at the DBBs and have crashes but they don't know they are looking at them and having crashes; it's all subconscious;

There is a simpler explanation available here of course: DBB / EMCs don't cause accidents or crashes. Again, one is reminded of *Occam's Razor*. And the rest of this hand-wringing about DBB / EMCs is generated by the subtext of the entire topic – Billboards and Advertising, and the very low esteem that they are held in. And painting with an even broader brush, On Premise signs are lumped in with Off Premise Billboards in a sort of crusade against a technology that some people just don't like – in a subjective sense – and this feeling has to be given objective form in the guise of a "scientific theory" and then subsequent DBB / EMC regulations.

Finally, the theories that the 2009 NCHRP Wachtel Report espouses will have a serious impact both Off and On Premise EMC sign installations and usage. This impact of course was not within the purview of the Wachtel report, as it was funded by governmental departments and agencies involved in the regulatory and bureaucratic aspects of DBB / EMC signs. The impact experienced will be both economic and legal.

- The 2009 NCHRP Wachtel Report will create the perceived need for some municipalities to spend valuable resources to substantially rework their Sign Codes to address the threats described in the report;
- The 2009 NCHRP Wachtel Report appears to be calling for Content Control on DBB / EMC devices, which will involve legal and First Amendment claims, and additional legal and litigation expense for all concerned;

- Given current economic times, the 2009 NCHRP Wachtel Report recommendations will have a great impact on the retail/commercial sector, when more restraint would seem to be advised, given that the report Recommendations are based on theory.

18. Implications for the Real World and the Need to Control

The thesis underlying the 2009 NCHRP Wachtel report has already been discussed. The 2009 NCHRP Wachtel report does not exist in a vacuum, and already commentators are offering their own interpretations and providing their own explanations of the 2009 NCHRP Wachtel Report.

Barry A. J. Clark, PhD, Director, Outdoor Lighting Improvement Section, Astronomical Society of Victoria Inc, Australia, offers the following explanation in his April 2009 presentation to the 22nd National Australian Convention of Amateur Astronomers at Mornington, Victoria, Australia; titled: *A Rationale for the Mandatory Limitation of Outdoor Lighting*:

> *"…while Wachtel believed that it is neither feasible nor necessary to demonstrate a causal relationship between EBBs and road safety (or its reduction). Instead, he thought that scientific understanding was already adequate for development of operational guidelines and ordinances."*

This assertion summarizes the 2009 NCHRP Wachtel Report rationale: nothing needs to be proven in a traditional, scientific or, more importantly, legal sense; circumstantial evidence and theoretical declarations can suffice. In contrast, the objective documentation of findings is the foundation of scientific proof for an assertion. It is hard to reconcile the two. Which suggests that a disconnect exists between the 2009 NCHRP Wachtel Report and reality.

The 2009 NCHRP Wachtel Report's response is, in part:

> *"Well let's control the distractions we can control"*

The operative word here, and for many jumping on the Electronic Sign restriction bandwagon, is **control**, and the desire to control and restrict and legislate. This *controlling* in part makes some citizens and professionals feel better, as they are trying to do some good or prevent some harm. But it also feeds a basic, innate, unspoken need in individuals *to control*; to control others; it is in the end an exercise in power; it is an exercise of power over perceived bullies and corporate interests and poor aesthetics; it is an exercise of power over those considered larger and more selfish, and that gives the controller or the regulator an internal feeling of satisfaction and vindication.

Whether the 2009 NCHRP Wachtel Report was written with that psychological mindset is impossible to know, but it is clear that the opinions and recommendations in the report were intended to be used by others, and since the author is an experienced researcher, and would have a very clear idea how the 2009 NCHRP Wachtel report would be used, and by whom – the regulators, planning professionals, town councils, State DOTs, citizen groups opposed to DBB /

EMC signs like Scenic America and so on. These are the intended groups, beyond the initial NCHRP group that funded the 1 ½ year study.

And these groups have already said:

> *"The Wachtel report proves that DBB / EMC signs are a traffic hazard."*
>
> *"The Wachtel report demonstrates that research funded by Industry is flawed and biased"*

The 2009 NCHRP Wachtel Report neither "proves" anything in regard to EMCs, Billboards, and accidents nor objectively demonstrates there is any error in the findings of research funded by Industry. In large part, the complaints in the 2009 NCHRP Wachtel Report about "industry" studies that suggest no linkage between DBB / EMCs are all procedural in nature. And as anyone who has conducted scientific research on signs or any other matter under scientific review where there is hypothesis, experiment , results and conclusion – there is always room to dissect and quarrel with aspects of any testing, in an academic sense.

DBB / EMC signs and On Premise sign illumination are perhaps the last planning frontiers out there for those interested in ***control***. Jurisprudence in the United States is fairly settled in regard to many Land Use and Planning matters, leaving signs, DBB / EMCs, and Sign Illumination as the next and perhaps final frontiers for justifying mandatory zoning controls of any kind, and the expert and consulting fees that may accompany such an effort.

And as a final note, the FHWA is currently conducting research in regard to DBB signs. Mr. Wachtel has been involved in the research process. It will be interesting to note if this pending study directly demonstrates the suspected link between DBB / EMC signs and traffic accidents and crashes, or if again it will contribute only to a theory on DBB / EMC signs based on supposition and extrapolation.

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Author's Note

The United States Sign Council (USSC) has concerns about certain aspects of the 2009 NCHRP Wachtel Report, as there may be potential flaws in some of the Report's theoretical assumptions and in the author's portrayal of current DBB / EMC usage on Billboards. The Report also displays a limited knowledge in regard to DBB / EMCs and zoning and regulatory law, and the Report's final recommendations appear to exceed common sense and current regulations on Digital Billboards in most states, in particular since there is no new research in the Report itself.

One of the primarily missions of the United States Sign Council is to seek out and understand all matters related to Drivers, signs and traffic safety, and to further the interests of the public in this regard. The USSC is the largest non-profit trade association of independent sign companies in the United States. The USSC has a sister organization, the United States Sign Council Foundation (USSCF), which is a 501(c)(3) charitable corporation, that funds research into signs, sign design performance characteristics, and the economic impact of on premises signs. The USSC mission is committed to improvement and progress in three identifiable areas: Sign Design, Sign Research, and Sign Education.

Since 1996, the USSC has allocated over $1.2 Million to research related to the necessary Design characteristics of On Premises Signs and has conducted over 13 research projects. Research Work performed by the USSC has been adopted by, reviewed, and/or published by the following professional organizations: the Transportation Research Board (TRB), the American Planning Association (APA), the International Code Council (ICC), the Illuminating Engineering Society of North American (IESNA), and the American Society of Civil Engineers (ASCE).