FHWA-NJ–20XX-00X

Guidelines for Preparing

NJDOT Research Final Reports and Tech Briefs

Rev. 03-23-2010

NJDOT
BUREAU OF RESEARCH

In cooperation with

New Jersey
Department of Transportation
Bureau of Research
And
U. S. Department of Transportation
Federal Highway Administration

Preface

The pages that follow provide guidelines, in the form of an example, for the creation of a NJDOT Research Final Report, DOT F 1700.7 TECHNICAL REPORT STANDARD TITLE PAGE (abstract) and Tech Brief. This guide provides consistence of style to the final reports and tech briefs that appear on the Research web site and are distributed throughout the State and across the Nation.

According to the principles of scientific or technical writing, the report must tell a story that summarizes the research effort. The Research Final report must contain the following:

- **Executive Summary** – Complete, concise summation of the Background (problem), Objectives, Research Approach, Summary of work performed, data collected, and analyses performed and the distilled results, and Conclusions and Recommendations
- **Background** – A summary of the problem or reasons for conducting the research
- **Objectives** - the criteria of "success" for this particular research study
- **Introduction** – The research approach to the problem
- **Summary of the Literature Review** – what lessons from the review of the literature affected the research approach
- **Summary of the work performed** - data collected, analyses performed, and the distilled results or findings,
- **Conclusions and Recommendations** based on the work conducted, the results determined, and in support of the study objectives.
- **Implementation and Training** - conducted or recommended

The report must be concise. Get to the point quickly. The report must be crafted to take the reader the shortest time to understand the work performed and the results obtained. Time is valuable - report pertinent information that supports the conclusions. Move supporting information to the appendices. Avoid duplication of information.

All research projects are successful. They may not reach the desired results, but if the work is done according to proper scientific principles, the effort provides valuable information that was not known before the research was conducted.

Internal and external reviews of the report are important. The researcher may be too close to the work to be objective. A critical review by colleagues for technical content and by a technical writer or editor for grammar and style will enhance the final report, the research effort, and the researcher.

Report number to be supplied by NJDOT Project Manager. The year of the final report must match the FHWA report number

FHWA-NJ-20XX-00X

Report Title to match title used on RFP

Guidelines for Preparing NJDOT Research Final Reports and Tech Briefs

FINAL REPORT
May 20XX

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Logo to be 1" by 1"

NJDOT Research Project Manager
Vincent Nichnadowicz

In cooperation with

New Jersey
Department of Transportation
Bureau of Research
And
U. S. Department of Transportation
Federal Highway Administration

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DISCLAIMER STATEMENT

"The contents of this report reflect the views of the author(s) who is (are) responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the New Jersey Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation. "

For projects being done for NJDOT this statement can be used verbatim. For projects being done for NJ Transit or NJ Motor Vehicles Commission the language must be adjusted accordingly.

No page number

Abstract page: DOT 1700
Template supplied by NJDOT

TECHNICAL REPORT
STANDARD TITLE PAGE

1. Report No. FHWA NJ-20XX-00X	2.Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle FINAL REPORT Use Arial font, 10 point for this page only.		5. Report Date May 20XX 6. Performing Organization Code
7. Author(s) Doe, John Ph.D. and Bob Doe Ph.D.		8. Performing Organization Report No.
9. Performing Organization Name and Address XYZ University Pleasantville, NJ 08880		10. Work Unit No. 11. Contract or Grant No.
12. Sponsoring Agency Name and Address New Jersey Department of Transportation PO 600 Trenton, NJ 08625 Federal Highway Administration U.S. Department of Transportation Washington, D.C.		13. Type of Report and Period Covered 14. Sponsoring Agency Code
15. Supplementary Notes		
16. Abstract This report outlines the guidelines for preparing Research Final Reports and Tech Briefs conducted for the Bureau of Research within the New Jersey Department of Transportation. This report is written in the format required by the Bureau. Explanations are given in green color. The Bureau has adopted these report writing standards to ensure that the final research reports are uniform and thus easily displayed on NJDOT's website and distributed in hard copy.		
17. Key Words Final Report, Tech Brief, Guidelines, Grammar, Punctuation.	18. Distribution Statement	

19. Security Classif (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No of Pages	22. Price

Form DOT F 1700.7 (8-69)

Page number i
Not shown

Total number of
Pages including
cover

ACKNOWLEDGEMENTS

The author(s) wish to thank various staff members without whom this rewrite would not have been possible.

The Acknowledgement should include names of students, other agencies, members of the Research Selection & Implementation Panel members, managers of stakeholder bureaus, and FHWA participants.

Center page number
Half inch from bottom

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FIRST-LEVEL HEADING (all capitals, boldfaced)
Second-Level Heading (initial capitals, boldfaced) *
Third-Level Headings (initial capitals, boldfaced, underlined)
Fourth-Level Heading (initial capitals, boldfaced, italic)
*** Indent 3 Spaces for each level of header**

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INTRODUCTION

The final report package will be prepared in accordance with the **Guidelines for Preparing Research Final Reports and Tech Briefs** and must include the following:

- An un-bound black and white version of the final report and tech brief (for copying)
- Ten (10) copies of the bound final report and tech brief
- CD-ROM with the final report, abstract (Form 1700), and tech brief in the latest version of Microsoft Word and PDF versions. In addition, the CD-ROM can contain copies of spreadsheets, databases, power point presentations made at quarterly meetings, digital photos, or other worksheets and documents as deemed important by the Principal Investigator and the Project Manager.

Files that are included must be in the programs of origin, such as PowerPoint, Word, Excel, etc., so that these files can be modified or corrected and re-imported into the full-text file. Art must be produced in a program that can export an interchange file format that can be imported into the full text. Photos provided must be in TIF or JPEG format.

The draft final reports are due not later than three months prior to the project completion end date. The Research Project Manager and University Principal Investigator will formulate the schedule of section review with the Research Project Selection and Implementation Panel (RPSIP) members. The draft sections of the final report and tech brief will be provided in electronic format so that the changes can be tracked.

The length of the final report, including cover, front matter, body, references, and appendix, shall not exceed 60 pages. The tech brief shall be two to six pages in length.

Type Arrangement and Typefaces

Type reports using single or one-and-one-half line spacing. Double space between paragraphs.

Margins must be at least one inch on all sides, including those pages containing figures and/or tables.

Arial font, 12 pitch, is to be used for all text contained in the Final Report.

Right-hand margins should not be justified. Avoid use of hyphenation to achieve a smooth right–hand margin. Pages with ragged right hand margins are easier to read and electronically correct.

Color may be used in the hard copy and electronic version of the Final Report and Tech Brief.

Widows and orphans are to be avoided by not leaving a single line of text at the top or bottom of a page.

Headings and Subheadings

Headings and Subheadings are to be typed as follows:

> **FIRST-LEVEL HEADING (**all capitals, boldfaced, on a separate line**)**
> **Second-Level Heading** (initial capitals, boldfaced, on a separate line)
> **Third-Level Headings** (initial capitals, boldfaced, underlined, on a separate line
> ***Fourth-Level Heading*** (initial capitals, boldfaced, italic, on a Separate line

Note: Do not indent the first line of any paragraph.

Volume Format

"Volume" designates an individually bound book. When a report exceeds 60 pages of reproduction copy, including figures, tables, appendixes, and front material, it should be divided into two or more volumes, each to be designated by a separate publication number and by a Roman numeral (example: Vol. I, Vol. II, etc.) as part of the subtitle. It should be listed on the Technical Report Documentation Page (form DOT F 1700.7).

Tables of contents, lists of figures, and lists of tables in multi-volume reports should cover the contents of all volumes. If previous volumes have already been published, later volumes should follow the same practice of a comprehensive listing, including page numbers.

References

Reference numbers should be superscript numbers enclosed in parentheses. Place them after end punctuation. If there is more than one reference, separate them with commas, but no spaces. Example: Xxxxxxxx. (2,3,9) For more than three reference numbers, use a separate sentence in parentheses. (See references 1, 5, 7, and 18.)

Use a single series of Arabic numbers beginning with 1 and continuing through the appendix.

Each reference should be cited within the main text. Materials not specifically cited may be listed in a bibliography placed at the end of the volume on the page(s) following the references. If a reference is cited more than one time in the text, repeat the number first assigned to the reference.

References must be consistent in punctuation and in the order of elements and with the same sequence numbers.

Examples of References

TRB Publication

V. Zahavi and J.M. Ryan. "**Stability of Travel Over Time**." In *Transportation Research Report* 750, TRB, National Research Council, Washington, D.C., 1980, pp. 70-75.

Book

D. Shinar, *Psychology on the Road: The Human Factor in Traffic Safety*. John Wiley and Sons, Inc., New York, 1978.

Periodical

J. K. Jolliffe and T.P. Hutchinson. "A Behavioral Explanation of the Association Between Bus and Passenger Arrivals at a Bus Stop" (in Japanese) *Transportation Science*, Vol. 9 No. 3, (May 1975), pp 248-282.

Government Reports

B.J. Dempsey. *Climatic Effects of Airport Pavement Systems: State of the Art*. Report DOT2DRD-75-196. FHWA, U.S. Department of Transportation, 1976.

Pagination

Front matter (ACKNOWLEDGEMENTS, Table of Content, List of Figures, List of Tables, etc.) -- Use lower case Roman numerals such as ii, iii, etc.

The Technical Report Documentation Page (form DOT F 1700.7) is always unnumbered page i.

Include Cover, Disclaimer page, front matter, body of the report, references, and appendixes in the page count in block 21 of the Technical Report Standard Title Page, NJDOT form 1700.7.

Use only one series of Arabic numbers from the first page of the report content to the last. Do not number appendixes pages A-l, B-l, etc.

Decimal numbers, hyphenated numbers, or numbers combined with letters for sections, or subsections are not permitted as page numbers.

Page numbers should be centered 0.5 in (12.7 mm) up from the bottom edge of the page and should stand alone with no dash on either side of the number.

Title pages for individual sections, appendixes, etc., may not be used.

Table of Contents

A table of contents is useful in most reports of more than 10 pages and is required in all reports of 10 or more pages.

Do not list front matter. List only the body of the text from page 1 through appendixes. Type styles for the headings in the table of contents must match those used in the report. Each level of subordination must consistently use the particular font style used in the heading, such as all capitals, bold, etc. Wording and punctuation must also be the same in the table as in the body of the report.

Lists of figures and tables are required in reports of 10 pages or more containing any figures or tables. Entries in the lists of figures and tables must match the captions

exactly in terms of capitalization, punctuation, and font style. Put the lists of figures and tables on the same page if both fit completely.

Figures and Tables

The following caption illustrates the standard style for figure and table captions.

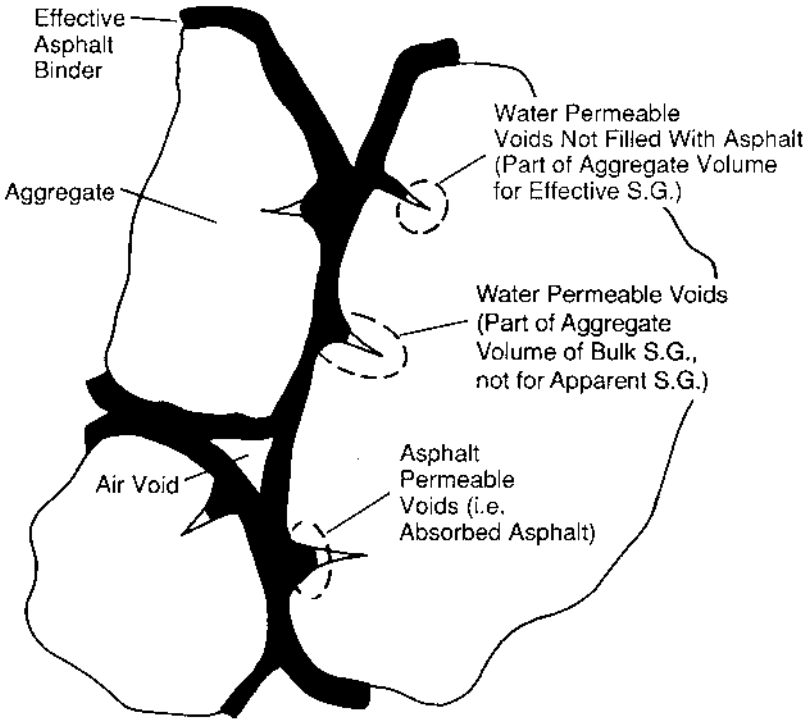


Figure 1. This is the correct form for punctuating, capitalizing, and centering for figure captions

Every figure must have a unique caption centered at the bottom. All captions must be in the same type style and size.

Table 1 - This is the correct form for punctuating, capitalizing, and centering for table captions

Font *		

* Fonts in tables may be adjusted to fit the information in a legible manner.

Every table must have a unique caption centered at the top. All captions must be in the same type style and size.

All figures and tables must be numbered in a single sequence from the beginning of the volume through the appendixes.

All illustrations and tabular materials must be numbered and captioned as figures or tables. Place each after its first callout within the text.

Lists

Lists should be bulleted unless the sequence of items is critical, in which case numerals followed by periods may be substituted for bullets.

Use a colon at the end of the preceding text sentence.

Use parallel rhetorical and grammatical structure in which each entry begins with a verb.

Begin each entry with a capital letter.

End each entry with a period.

Numbers

Numbers from one through nine, used within the text, are spelled out. Use numerals for numbers 10 and above. However, if a number 10 or above is in the same sentence with a lower number, use numerals for all.

Units of money, measurement, and time (actual or implied) are expressed in numerals. These do not affect, and are unaffected by other numbers in a sentence.

Abbreviations, Acronyms, and Symbols

Establish each abbreviation and acronym by spelling out the term the first time it is used followed by the acronym in parentheses, such as Federal Highway Administration (FHWA). In addition, if the report has many acronyms, a list of abbreviations may be included after the list of tables.

Use these abbreviations for units of measurement. Abbreviations used for units of measurement are the same for both singular and plural. Examples of some commonly used units follow:

mi for mile(s)
mi^2 for square mile(s)
mi/h for miles per hour (not mph)
km/h for kilometers per hour
in for inch(es)
in^3 for cubic inch(es)
m for meter(s)
ft for foot (feet)
ft^3 for cubic foot (feet)
lb for pound(s)
lbf/in^2 (not psi)
in^2 for square inch(es)
ft^2/s for square foot (feet) per second
s for second(s)

Do not use periods after these abbreviations.

"Percent" should be spelled out in the text. The symbol "%" may be used in figures and tables.

Footnotes

Use superscript figures without parentheses or brackets for footnote references.

Text footnotes begin with 1 in each section.

Footnotes must begin on the page carrying the footnote number. Avoid breaking a footnote between pages.
Footnotes should be single spaced. Indent the first line four spaces.

Footnotes to tables or figures begin with 1 for each table or figure. Use superscript numbers.

Asterisks may be used only when a numeral in a table or figure might cause confusion, such as being mistaken for an exponent.

Punctuation

Use a hyphen between the elements of compound numbers from twenty-one to ninety-nine (when they must be spell out) and in compound adjectives with a numerical first element. For example:

24-in ruler
8- by 12-in page
3-m-wide screen
four-lane highway
3- to-1 ratio
1/2-in diameter pipe

When parentheses or brackets are used to enclose an independent sentence, the period falls inside. (See reference 1.) If the enclosed matter is part of a sentence, the period falls outside (when the enclosed matter completes the sense of the sentence).

Periods and commas should be placed inside quotation marks; semicolons fall outside quotation marks.

Use a comma after each member within a series of three or more words, phrases, letters, or figures used with "and," "or," or "nor."

Use semicolons to separate groups of items only when commas are already used within each group. For example, "He checked the streets, highways, and lanes; the subways, bus routes, and airlines; and the theaters, museums, and art galleries." In other instances in which intervening commas are used and confusion may result, use semicolons to separate elements containing commas.

Equations -- Number equations with a single series of Arabic numerals through the appendixes. Enclose each number in parentheses at the right margin on the last line of the equation. For example:

$$A = b + c \qquad (1)$$

Explain or identify each variable and constant in the equation.

Other

Common nouns such as table 1, section 2, sample A, reference 4, appendix A, etc., should not be capitalized within the text.

The word "State" should be capitalized when referring to a geographic or governmental entity.

The words "Federal" and "Government" are capitalized, whether they appear together or alone, when referring to the Federal Government. The word "Nation" is capitalized when used as a synonym for the United States.

The prefixes and suffixes listed below generally do not require a hyphen when joined with other words:

multi
super
pre
micro
under
re
like
semi
post

However, use a hyphen with the following in all cases in which they are used as reflexive prefixes: ex-, self-, and quasi-.

Keep numbers and units of measurement or words that depend on each other for meaning together on the same line of type. (For example: chapter 5, 25 percent, 31 mm.)

Order of Elements for Final Reports

(Not all elements are necessarily used in all reports)

Front Matter	Front Cover
	Disclaimer Notice
Page i	Technical Report Documentation Page (Form DOT F 1700.7) (Counted as page i, but always unnumbered)
Page ii	Acknowledgments
Page iii	List of Contents
	List of Figures
	List of Tables
	List of Abbreviations and Symbols
Body of Report Starting with page 1	**Executive Summary** – Complete, concise summary of the Background (problem), Objectives, Research Approach, Summary of work performed, data collected, and analyses performed and the distilled results, and Conclusions and Recommendations
	Background – Reasons for conducting the Research
	Objectives - criteria of "success" for this particular research study
	Introduction – The research approach to the problem
	Summary of the Literature Review – what lessons from the review of the literature affected the research approach
	Summary of the Work Performed - data collected, analyses performed and the distilled results or findings
	Conclusions and Recommendations - based on the work conducted, the results determined and in support of the study objectives
	Implementation and Training - conducted or recommended
Reference Material	
(Continue with consecutive pagination, do not use A-1, etc.)	References
	Bibliography
	Appendixes (optional)

New Jersey DOT's Technical Briefs

The tech brief is a summary of the research project written in "newspaper" style. It should be limited to one page, double sided and should include figures, tables, and photographs to capture the important aspects of the project in a short easy to read format.

Typical tech briefs present a summary of the project's background and introductory information, the research approach, a general discussion of the major findings, and conclusions, and recommendations.

(Please refer to the template and sample tech brief on the next pages for the format that must be used.)

March 2010 **FHWA-NJ-xxxx-xx**

New Jersey Department of Transportation
Bureau of Research

Technical Brief

Research Project Title in Full

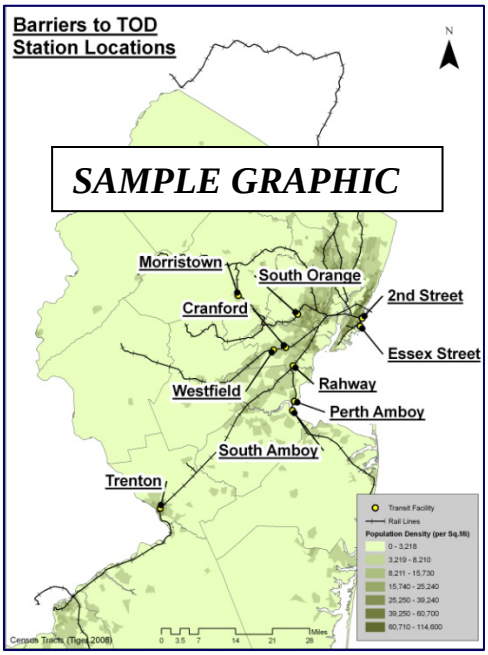
This section should be two or three sentences, at most, summarizing the project in easy to read language understandable to someone not necessarily familiar with the subject matter. Rather than cutting and pasting from the final report the writer should try to summarize the report using their own words.

Background

One paragraph giving the reasons why the research was done and any particular background specifics that affected the research. Keep in mind the entire Technical Brief is limited to one page, double sided. Do not change font styles or sizes. Do not change headings or spacing.

Research Objectives and Approach

State the main research objectives and goals. Briefly summarize the approach that was taken by the research. A graphic, as shown, should be included for visual interest and clarification of some aspect of the report.



Findings

This should be the longest section. Bullets can be used to highlight all findings in a concise manner. Avoid jargon, acronyms, and references to additional material. The purpose of the technical brief is to wet the readers appetite prior to requesting the final report.

An example of findings:

- The reader is more likely to read a short paper rather than a long one.
- The reader may not be an expert in the field of the research. Language should be directed towards what would be found in a national newspaper.

For More Information Contact:

NJDOT Project Manager:	name
	Telephone number
	E-mail contact
Principal Investigator:	name
	Affiliation
	Telephone number
	E-mail contact

A final report is available online at: http://www.state.nj.us/transportation/refdata/research/. If you would like a copy of the full report, send an e-mail to: Research.Bureau@dot.state.nj.us.

Research Title in Full
NJDOT Research Report No: FHWA-NJ-xxxx-xx

APPENDIX – TECH BRIEF EXAMPLE

March 2010 **FHWA-NJ-2010-002**

New Jersey Department of Transportation
Bureau of Research

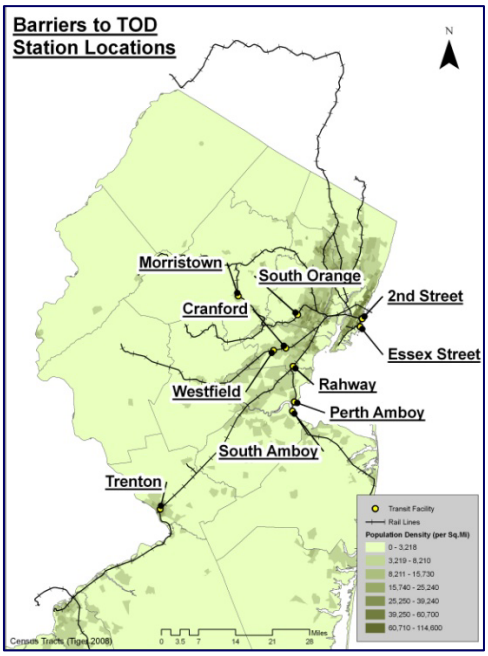
Technical Brief

Eliminating Barriers to Transit-Oriented Development

This report looked at three conditions that could be barriers to transit-oriented development: impacts on schools; impacts to local auto traffic; and, impacts on local parking. Ten transit stations in distinct communities were investigated, comparing households living near rail stations as well as farther away in both old and new housing.

Background

"Transit-oriented development" refers to dense, mixed-use development near transit facilities, particularly denser housing development. Achieving such density is a politically difficult goal. In New Jersey, the main barriers are community concerns about the potential of new development to cause parking problems, increased traffic, and negative fiscal impacts because of increased school enrollments. Many residents fear increased auto traffic, parking problems, and an influx of additional school-age children which may increase property tax. The main purpose of this study was to investigate whether these perceptions were accurate.



Research Objectives and Approach

To observe differences between households located close to transit stations and those further away, we conducted a survey of households located within two miles of ten NJTRANSIT rail stations. We compared responses from households living within a half mile of stations with those living more distant. In order to assure representation of those residents living closest to stations, we oversampled households within a quarter mile of the stations and we oversampled households living in newly constructed housing. Our investigation also considered the effect of supply factors, particularly the availability of on-street and off-street parking, and school quality.

Findings

We found that the impacts of transit-oriented development on schools, local auto traffic, and parking were not nearly as significant as the public thinks.

We found robust evidence that the per-household impacts of new development on local school districts are much lower in developments near rail stations. This provides the strongest evidence that we are aware of to debunk the myth that new housing near transit will increase property tax.

This study also highlights that the size of home/apartment/condominium and the availability of parking directly affects commuting mode and auto ownership. Smaller households seek smaller housing and also drive less.

The policy implications of this study are:

- Local land use policies near rail stations should take into account lower school enrollment impacts of housing there. A reasonable estimate would be half the number of school children as found in new development elsewhere.

- Local land use policies for high density development, whether in urbanized areas or elsewhere, should take into account substantially reduced auto ownership and use in high density housing and rental housing. Auto ownership is a third lower in apartment/condominium settings and 25 percent lower in rowhouse/townhouse settings, compared to single family homes. Auto ownership is also 22 percent lower in rental units regardless of housing type. Based on these results we estimate that a household living in a rented apartment will have about half the number of vehicles of a household in an owner-occupied single family home.

- Parking policies should be reformed to maximize the potential of transit-oriented development. Lower on-street parking is highly correlated with less driving to work. Smaller amounts of on-street parking require managing on-street parking with permits and metering. This enables higher density development. The results strongly imply that parking availability should be taken into account when estimating the traffic impacts of new development near transit.

For More Information Contact:

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Principal Investigator:	Jon A. Carnegie, AICP/PP
	Alan M. Voorhees Transportation Center, Rutgers University
	732-932-6812 ext. 606
	carnegie@rci.rutgers.edu

A final report is available online at: http://www.state.nj.us/transportation/refdata/research/. If you would like a copy of the full report, send an e-mail to: Research.Bureau@dot.state.nj.us.

Eliminating Barriers to Transit-Oriented Development
NJDOT Research Report No: FHWA-NJ-2010-02