FINAL DRAFT

Bike Lane Barriers

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English 21007: Writing for Engineers

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Outline of Contents

1. **Press Release**

A group of extremely smart and intelligent young aspiring engineers has recently proposed Lane Splitters. These Lane Splitters are a low-cost, modular bike lane barrier system, but what makes these different from the ones that we currently have, which barely exist? These are constructed from ABS (Acrylonitrile Butadiene Styrene) plastic, which makes them more sustainable than the current concrete barriers that we have, and also makes them more cost-effective. The group says that the Lane Splitters were designed as a result of the growing number of collisions between cyclists and pedestrians within the tight and busy New York City streets. The design took inspiration from the flexible loop arch barrier designs that have been seen all throughout Europe's cycling system. These “Lane Splitters” don't just look cool, but they can easily be manufactured here in NYC, and they can easily be installed. They look cool, save money, are sustainable, easy to produce, and most importantly, SAVE LIVES!!!! What more can you want??

In 2023 alone, NYC has seen over 6,000 cyclists injured. Most of these injuries came from areas that have little to no separation between bike lanes and foot traffic (NYC Department of Transportation 2024). Lane Splitters address this problem directly: They are flexible yet durable ABS plastic arch strips, which are anchored to a steel base to ensure no one takes them home or tampers with them. They're easy to see, and prioritize safety above all else; they deflect on impact instead of causing injuries, all while properly segregating bike traffic and foot traffic.

The other options available in the market, like concrete barriers or metal bollards, help, but they can seriously injure cyclists or pedestrians who come into contact with them. Lane Splitters have an arched design that flexes on impact and returns to its shape. This makes them extremely effective at reducing harm in scenarios where individuals make contact. This modular

system is weather-resistant, UV-stabilized, and designed for quick and easy installation or replacement, something the people of New York City would greatly appreciate.

A group spokesman says, “Our communities deserve to have the peace of mind knowing cyclists won't hit them while they cross, our city deserves infrastructure that functions and protects everyone.”

The proposal aims to target areas where there is little to no separation between cyclists and pedestrians, such as Union Square. These young engineers estimate the cost will be significantly lower than the current barrier solutions. They are excited to receive feedback from city officials and say they are prepared for whatever comes next.

2. Introduction

In Union Square alone, two out of five group members have nearly been involved in bike accidents. It might be a coincidence, or it might be a wake up call to do something about bikes in New York before another group member joins the statistic. New York is one of the most crowded cities with 27,547 residents per square mile and a total population of 8,336,817(Gregory, 2023); without a doubt the city can be extremely difficult trying to navigate through, especially with a bicycle. Some of the most common problems include obstructions in the bike lane from both pedestrians and motorized vehicles, as well as a lack of protection for bike lanes and multiple intersections that inevitably cause accidents. With that in mind, there are plenty of types of barriers that range from pricing with different purposes and benefits as well. Cheap temporary barriers such as plastic bollards or Traffic Delineators range in pricing and start from $15-$42(Traffic Cones For Less.com, n.d.), yet are often run over and ignored by pedestrians. On the other hand, the heavier solutions come at a cost and can only be effective for a certain distance such as concrete parking curbs which start from $399.95. Or, concrete planters that can

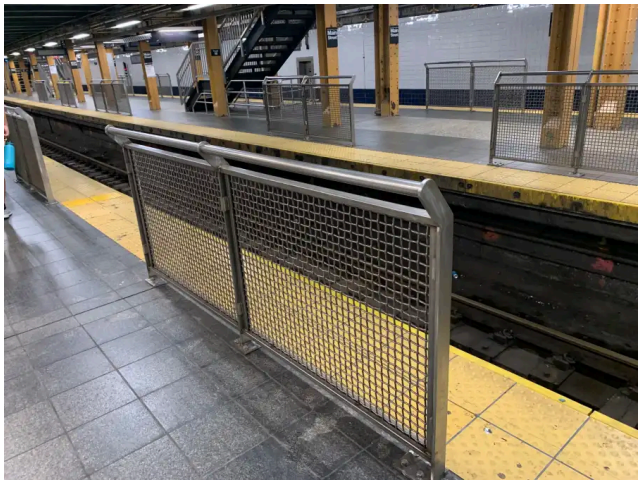
range from $300-$1000(*Concrete Barriers - Concrete Jersey Barriers for Sale*, n.d.). Our goal is to install adequate and efficient barriers made of ABS recyclable plastic and rubber to keep cars completely separated from cyclists all the while discouraging people from blindly crossing through bike lanes. Unfortunately, it is up to the government and city to act on this issue but this won’t stop people from seeking solutions.

3. **Proposed Program: Keeping Pedestrians Out of the Way with Better Bike Lanes**

Bike lanes are what protect cyclists from the deadly multi-ton marvels of human engineering; cars. Thus, bike lanes are essential in providing a means of commute for many working New Yorkers. According to the New York City Department of Transportation (DOT), in 2023 alone, approximately 61,600 New Yorkers relied on bicycles for their daily commutes (New York City Department of Transportation, 2026). And with delivery services such as Door Dash and Uber Eats offering; considering that in 2024, 2.77 million deliveries were made per week per the New York City Department of Consumer and Worker Protection; the amount of people on bike lanes is exorbitant. (New York City Department of Consumer and Worker Protection, 2024).

In 2023 alone, 52,950 citizens, including pedestrians and riders, were injured; 244 dead (DOT, 2023). Therefore, creating a clear separation between both pedestrian and rider is necessary in preventing tens of thousands of injuries. This is where guard rails come in. Like the guard rails found in many MTA subway stations (see Figure 1), a barrier separating pedestrians and bike lanes will deter pedestrians from walking onto the bike lane and risking injury or death.

Figure 1: Metal Guard Rails in Flushing Subway Station

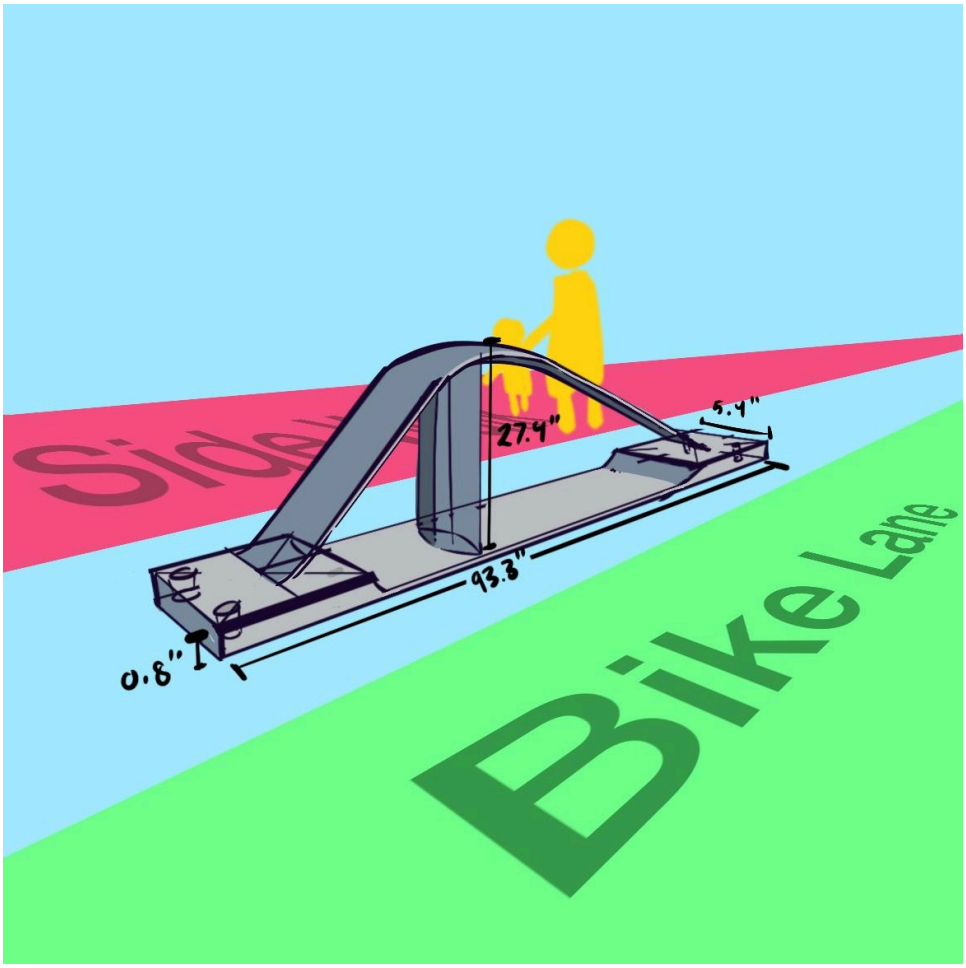


Source: Photograph by Barbara Russo-Lennon, 2025

However, a metal barrier like this is costly; mainly due to material costs. More importantly, metal mesh barriers could interfere with snow plowing, letting snow pile up on the bike lanes, and forcing cyclists to ride on the car lanes. Therefore a skeletal design that is ideally made out of a cheaper material like hard plastic would be more ideal for a bike lane barrier. A skeletal design would mean more opening for substances like snow to pass through, while simultaneously reducing the amount of materials needed to manufacture the barriers.

3.1. Design of The Barrier

Figure 2: Mockup of the Proposed Barrier: “Lane Splitter”.

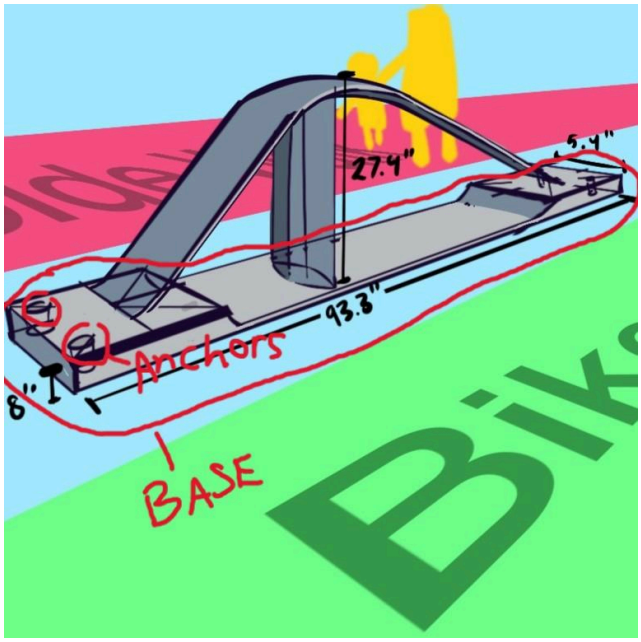


Source: Illustration by Brian Narvaez, 2026

The “Lane Splitter” is a barrier that separates the sidewalk and the bike lane. It is made of hard plastic, recycled rubber and sports a skeletal design, ensuring cheap manufacturing. Each lane splitter is laid out one after the other and screwed into the asphalt to ensure reliable security for civilians. There are three components to these lane splitters: the base, tent, and column.

3.1.1. The Base

Figure 3: Base of the Lane Splitter.

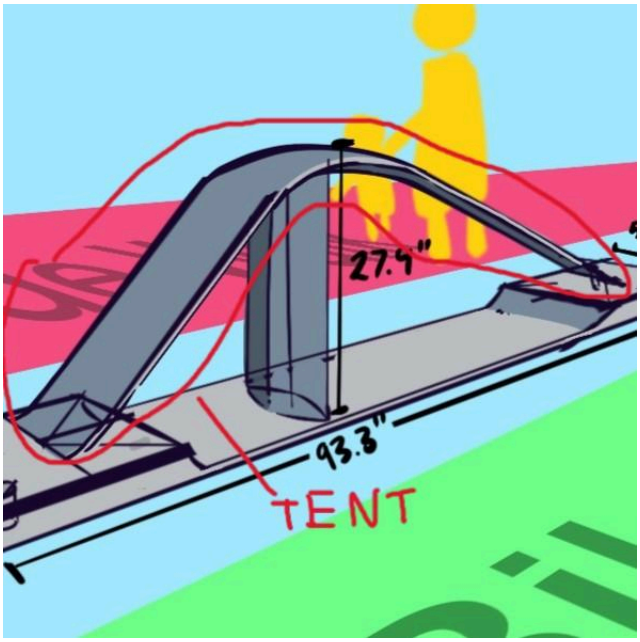


Source: Illustration by Brian Narvaez, 2026

The base of the lane splitter can get as tall as 0.8 inches and is made out of recycled rubber, similarly to the rubber used to make traffic cones. This provides an adequate foundation for the lane splitter, ensuring stability. On each end of the base, there are two large holes for the asphalt anchors (a type of screw made for asphalt) that will be driven into the asphalt, ensuring that the lane splitter is not removed without permission.

3.1.2. The Tent

Figure 4: The Tent of the Lane Splitter.

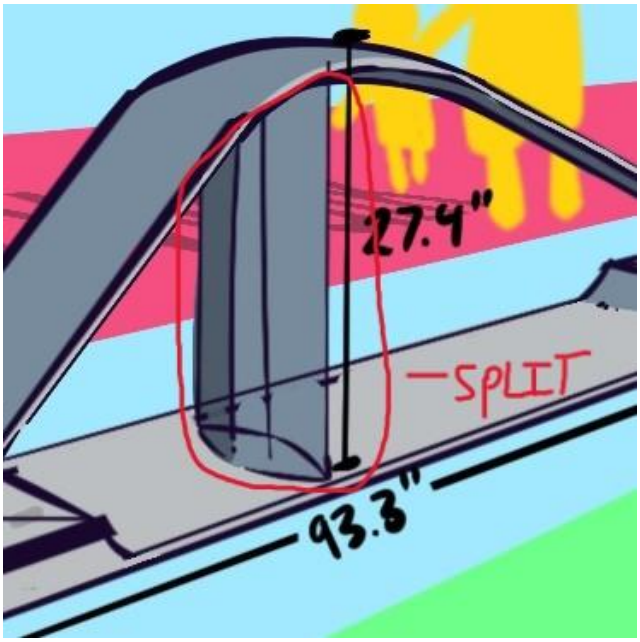


Source: Illustration by Brian Narvaez, 2026

The tent dictates the overall height of the lane splitter, reaching 27.4 inches. The tent is the crux of the lane splitter, acting as the barrier between the sidewalk and the bike lane. The tent is made out of white hard plastic, with a thickness of 0.5 inches; which is also retrofitted with reflective sheeting to provide visibility at night.

3.1.3. The Split

Figure 5: The Split of the Lane Splitter



Source: Illustration by Brian Narvaez, 2026

The split is an oval shaped column of white hard plastic that splits the underside of the tent in the middle. The split is mainly for added support for the tent, ensuring that it can’t be crushed under adequate weight. The split also serves as a barrier so that children don’t crawl under the tent.

3.2. The Lane Splitter in Action

Figure 6: Union Square on Broadway and East 17th Street

Source: Photograph by Brian Narvaez, 2026

Considering an open area like Union Square, installing some sort of barrier (like the Lane Splitter) between sidewalks and bike lanes could definitely improve the overall safety of that area. And it would look something like this:

Figure 7: Broadway and East 17th Street with Proposed Lane Splitter

Source: Illustration and Photograph by Brian Narvaez

4. Innovation Process

The development of the “Lane Splitter” barrier system focuses on creating a safer, cheaper, and more sustainable alternative to traditional bike lane barriers currently used throughout New York City. Unlike concrete dividers or metal railings, the Lane Splitter uses a lightweight skeletal design constructed primarily from recycled ABS thermoplastic and recycled rubber. This innovation process prioritizes affordability, safety, sustainability, and ease of installation while still maintaining durability in high-traffic urban environments.

Cost Analysis

One of the primary goals of the Lane Splitter project is reducing overall production and installation costs compared to traditional concrete barriers. Current concrete barriers can range from approximately $300 to over $1000 per unit depending on size and installation requirements, while temporary bollards range between $15 and $42 but are often ineffective and easily damaged.

The proposed Lane Splitter barrier would cost significantly less because it uses recycled ABS plastic and recycled rubber rather than concrete or steel-heavy materials. By recycling plastic waste already produced throughout New York City, manufacturing costs can be reduced even further. The estimated production cost for one Lane Splitter is approximately $65–$90 per unit depending on material availability and production scale.

Estimated Cost Per Barrier

Component	Estimated Cost
Recycled ABS Plastic	$30
Recycled Rubber Base	$15
Reflective Sheeting	$5
Asphalt Anchors & Bolts	$10
Labor & Installation	$15–$30
Total Estimated Cost	$65–$90

Although initial production may cost more during prototype development, mass production would significantly lower manufacturing expenses over time.

Time Requirements

The Lane Splitter barriers are designed to be produced efficiently using modern manufacturing techniques such as industrial 3D printing and plastic molding. Based on current 3D-printing capabilities, one barrier would take approximately 10 hours to fully produce due to the high-density infill and enclosed printing process required for durable ABS thermoplastic.

Estimated Project Timeline

Stage	Estimated Time
Research & Data Collection	1 Week
Barrier Design & Sketching	1 Week
Prototype Development	1 Week
Material Testing	3–5 Days
Presentation Preparation	1 Week

Installation time would remain relatively short because each modular barrier section can be quickly anchored directly into asphalt using asphalt screws and bolts.

Materials and Description of Materials

The Lane Splitter barrier system uses a combination of recycled materials selected for durability, flexibility, weather resistance, and sustainability.

ABS Thermoplastic

The primary material used for the tent and split sections is ABS (Acrylonitrile Butadiene Styrene) thermoplastic. ABS plastic is highly durable, lightweight, weather-resistant, and impact-resistant. It is commonly used in traffic safety products because it can withstand constant

outdoor exposure without cracking easily. Additionally, ABS plastic can be recycled from existing plastic waste, making the project environmentally sustainable.

Recycled Rubber

The base of the barrier uses recycled rubber similar to the material found in traffic cones. This material absorbs impact effectively while providing stability and flexibility. The rubber base also helps prevent damage to bicycles or pedestrians in the event of accidental contact.

Reflective Sheeting

Reflective strips attached to the tent section improve nighttime visibility for cyclists, pedestrians, and drivers. This increases safety in low-light and poor-weather conditions.

Asphalt Anchors

Steel asphalt anchors secure each barrier directly into the pavement. These anchors prevent the barriers from being removed, stolen, or displaced by traffic or weather conditions.

Labor Power

The production and installation of the Lane Splitter barriers would require cooperation between several groups of workers and professionals.

Engineers

Civil and mechanical engineers would oversee the design, safety testing, and structural performance of the barriers. Engineers would also analyze how the barriers interact with traffic flow and pedestrian movement.

Construction Workers

Construction workers and road maintenance crews would install the barriers onto existing bike lanes using asphalt anchors and specialized drilling equipment.

Manufacturing Workers

Factory workers and machine operators would oversee the molding, recycling, and production of ABS thermoplastic components.

City Inspectors

Transportation officials and city inspectors would evaluate installation quality, safety standards, and maintenance requirements before public implementation.

Sustainability and Long-Term Benefits

A major advantage of the Lane Splitter project is its environmental sustainability. New York City produces large amounts of plastic waste every year, much of which ends up in landfills or pollutes local waterways. By recycling this plastic into ABS thermoplastic for bike lane barriers, the project helps reduce environmental waste while creating safer infrastructure for cyclists and pedestrians.

The modular design also reduces long-term maintenance costs because damaged sections can be individually replaced instead of removing entire barrier systems. In addition, the skeletal design allows snow, rainwater, and debris to pass through more easily than solid concrete barriers, preventing buildup that could block bike lanes during winter storms.

5. Appendices

Appendix #1 for intro paragraph 1: “New York is one of the most crowded cities with 27,547 residents per square mile and a total population of 8,336,817”

Rank	City	Population	Land Area (Square Miles)	Population Density
1	New York, NY	8,336,817	302.64	27,546.98
2	San Francisco, CA	881,549	46.87	18,808.38
3	Jersey City, NJ	262,075	14.79	17,719.74
4	Boston, MA	692,600	48.28	14,345.48
5	Miami, FL	467,963	35.87	13,046.08

Gregory, L. (2023, May 9)

Appendix #2 for intro paragraph 1: “heavier stuff like concrete parking curbs can start from $399.95, concrete planters that can range from $300-$1000”

Item #	Image	Description	Price
LB-48		**Concrete Traffic & Safety Barrier 48", 750 lbs.** • LB-48 Concrete Jersey Barrier for Traffic and Safety Applications • Forklift Knockouts for easy placement. • 48"L x 24"W x 32"H, Top of unit is 6" thick • 750 lbs. • Gray Finish • Full Truck Load is 60. • Call for freight quote. Please request a quote for shipping >> Special Pricing Available **Will be shipped via: TRUCK FREIGHT – COMMERCIAL ADDRESSES ONLY**	$399.95 SALE MORE DETAILS
LB-48-V		**Concrete Traffic & Safety Barrier 48", 480 lbs.** • VLB-48v linkable concrete traffic barriers with forklift knockouts. • 48"L x 24"W x 32"H • 480 lbs. Please request a quote for shipping >> Special Pricing Available **Will be shipped via: TRUCK FREIGHT – COMMERCIAL ADDRESSES ONLY**	$479.95 SALE MORE DETAILS
B-48		**Concrete Traffic & Safety Barrier 48"L x 36"H x 24"W, 1600 lbs** • SB-48 Concrete Safety Barrier with Forklift Knockouts • 48"L x 24"W x 36"H • 1600 lbs • Designed for heavy duty military and commercial use.	$499.95 MORE DETAILS

Concrete jersey barriers for sale. (n.d.).

Appendix #3 for intro paragraph 1:

Flexible bollards:

- Often surface-mounted to concrete or asphalt with anchors or embedded bases
- Typically used as semi-permanent or permanent fixtures as part of the site design
- Some models offer removable mounting systems, reducing subsequent replacement installation costs to zero

Traffic delineators:

- Can be permanently anchored or attached to portable, spring-loaded bases
- Frequently deployed in temporary or changing layouts (construction, events)
- Installation costs typically $60–$150, generally less expensive than bollards
- Faster to install and reposition, but often less integrated into long-term site design(Fisher)

Appendix #4 for proposed program paragraph 2: “In 2023 alone, 52,950 citizens, including pedestrians and riders, were injured; 244 dead”

	Crashes Involving Motor Vehicles (Traffic Injuries & Fatalities)									
Borough	Pedestrian Injuries	Pedestrian Fatalities	Bicyclist Injuries	Bicyclist Fatalities	Occupant Injuries	Occupant Fatalities	Other Motorized Injuries	Other Motorized Fatalities	Total Traffic Injuries	Total Traffic Fatalities
Manhattan	1,565	18	1,479	3	4,477	10	329	2	7,850	33
Bronx	1,438	18	493	3	7,013	26	316	1	9,260	48
Brooklyn	2,950	28	1,882	9	11,743	27	1,022	3	17,597	67
Queens	2,279	33	891	5	11,776	41	530	3	15,476	82
Staten Island	388	4	84	2	2,267	8	28	0	2,767	14
Citywide	8,620	101	4,829	22	37,276	112	2,225	9	52,950	244

(Bicycle Crash Data -2023)

#5 Useful information that shows why this project is so important and where exactly it should be used

Year	Total Traffic Injuries	Bicyclists Injured	%
2013	49,882	3,884	7.8%
2014	51,029	3,982	7.8%
2015	53,163	4,433	8.3%
2016	59,396	4,592	7.7%
2017	58,671	4,397	7.5%
2018	60,652	4,304	7.0%
2019	60,571	4,611	7.6%
2020	43,841	5,175	11.8%
2021	50,729	4,618	9.1%
2022	50,726	4,676	9.2%
2023	52,950	4,829	9.1%
2024	54,005	5,148	9.5%

(Goldwater,9 April 2025)

Appendix #6 for proposed program paragraph 1:approximately 61,600 New Yorkers relied on bicycles for their daily commutes

	Bike Commuters (to work)	Bike Commute Trips (to work)	Total Daily Cycling Trips*	Total Annual Cycling Trips (in millions)
2008	23,500	47,000	240,000	87.6
2009	24,400	48,800	240,000	87.6
2010	25,000	50,000	250,000	91.3
2011	26,900	53,800	270,000	98.6
2012	31,500	63,000	320,000	116.8
2013	37,600	75,200	380,000	138.7
2014	41,800	83,600	420,000	153.3
2015	45,000	90,000	450,000	164.3
2016	45,800	91,600	460,000	167.9
2017	48,800	97,600	490,000	178.9
2018	50,900	101,800	510,000	186.2
2019	52,700	105,400	530,000	193.5
2021	55,000	110,000	550,000	200.8
2022	61,200	122,400	610,000	222.7
2023	61,600	123,200	620,000	226.3

NYC DOT (N.D)

REFERENCES

Appendix #1: Gregory, L. (2023, May 9). *The Most Crowded Cities in America*. The Rent. Blog : A Renter’s Guide for Tips & Advice. https://www.rent.com/blog/most-crowded-cities-in-america/

Appendix #2: *Concrete barriers - Concrete jersey barriers for sale*. (n.d.). https://www.trafficsafetywarehouse.com/Concrete-Barriers/products/85/

Appendix #3: Fisher, Ryan. “Flexible Bollards vs Traffic Delineators: What’s the Difference?” *Reliance Foundry*, 5 Feb. 2026, www.reliance-foundry.com/blog/flexible-bollards-vs-traffic-delineators. Accessed 7 May 2026.

Appendix #4: *Bicycle Crash Data -2023*. 2023. https://www.nyc.gov/html/dot/downloads/pdf/bicycle-crash-data-report-2023.pdf

Appendix #5: Goldwater, Robert. “New York Bicycle Accident Statistics for 2026 | Bicycle Accident Lawyers Group.” *Bicycle Accident Lawyers*, 9 Apr. 2025, bicycleaccidentlawyers.com/new-york-city/accident-statistics/. Accessed 5 May 2026.

Appendix #6: “NYC DOT - Bicyclists - Ridership Statistics and Reports.” *Www.nyc.gov*, www.nyc.gov/html/dot/html/bicyclists/bikestats.shtml.

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Narvaez, B. (2026e). *The Tent of the Lane Splitter*. Retrieved 2026,.

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(assignment reference)

Assignment #5 Proposal & Presentation and Reflection Worksheet

This is a group project composed of a proposal and presentation. You will be divided into groups in class. Your group will identify a need or void that presents an opportunity to propose a specific engineering innovation. The proposal will be a well-written, focused solution to a problem. This problem should be local: speak with your neighbors, mine your own experiences, and look around your communities. Your group project should be utilized on a micro-scale in a local area. For example: NYC catch basins (CATCH BASINS | NYC.gov) allow NYC sewer systems to drain our streets and communities. When these catch basins get clogged with leaves and litter, our sewer system gets backed up. Imagine a redesign of the NYC catch basins. The focus would be on developing a new catch basin that meets the needs of increased rain water, increased leaves, and increased litter.

Proposal Components:

- Title page – presents the title of the project and names those who worked on the project against an interesting graphic backdrop.
- Press release - Briefly describes the proposed program's relevance to the "real world". Do not be afraid to explore and cite specifically and clearly how your proposed program will help the world and solve problems. Please consult this blog post for a great "how-to": How to Write a Press Release [Free Press Release Template + Examples]
  - Summary- Briefly describes the proposed program and states qualifications, experience, and budget. This section is single-spaced and no more than 250 words. It is included after the Title page.
  - Introduction- This should **describe** the problem in specific terms (costs are important here), the **purpose** (what you want to do), the **background** of the problem or opportunity (show your readers that you understand the problem, the circumstances that led to its discovery), identify the **sources** of your information (research relevant literature), **the scope** of proposal (what you will accomplish and not accomplish), **organization** of proposal, and any key terms in the proposal (define unusual and specialized terms).
  - Proposed Program- Technical description of the innovation with graphics and spec sheets. Graphics and photographs taken by your

group in your local community need to be included and cited according to APA standards

- Innovation Process - This will include COST, TIME, MATERIALS, DESCRIPTION OF MATERIALS, LABOR-POWER… and all other necessary and important factors. (These components can be rough estimates and theoretical if need be. You can draw this information from the production and data of similar and previously invented innovations. Cite all research according to APA standards.)
- Appendices-Includes a task schedule of this project and a description of evaluation techniques used for the project.

Presentation Component:

- A presentation (seven minutes) is required to be performed in the last few days of the semester. You are NOT allowed to read the proposal out loud; this presentation needs to be nuanced, interesting, and encourage discussion.
- Every member of your group (for which you will have a name) will participate in the presentation. You will be required to report what each member of the group did for the project.
- Your classmates will challenge and ask questions after the in-person presentation. Your group will then answer these questions professionally.
- You will notice there are several components to the project. You will have to determine amongst yourselves who will be responsible for which project components. Identify individual strengths and work with those. Who is your team leader? Who's the best speaker? Who's best and most familiar with PowerPoint?

You will produce your own work and have your material commented on, proofread, edited, changed, etc. by your group. You will have time in class to work on this final project, but you will also need to communicate with your group via email, text, discord, etc. **Format:** APA

PRESS RELEASE

Omar

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A group spokesman says, “Our communities deserve to have the peace of mind knowing cyclists won't hit them while they cross, our city deserves infrastructure that functions and protects everyone.”

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Intro

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In Union Square alone, two out of five group members have nearly been involved in bike accidents. It might be a coincidence, or it might be a wake up call to do something about bikes in New York before another group member joins the statistic. New York is one of the most crowded cities with 27,547 residents per square mile and a total population of 8,336,817(Gregory, 2023); without a doubt the city can be extremely difficult trying to navigate through, especially with a bicycle. One of the most common problems include obstructions in the bike lane from both pedestrians and motorized vehicles. This ignorance harms all parties: vehicles, cyclists, and pedestrians. There is also a lack of protection for bike lanes and multiple intersections that inevitably cause accidents. With that in mind, there are plenty of types of barriers that range from pricing but have different purposes and benefits as well. Cheap temporary barriers such as plastic bollards or Traffic Delineators range in pricing and start from $15-$42(Traffic Cones For Less.com, n.d.) yet are often run over and ignored by pedestrians. On the other hand, heavier stuff like concrete parking curbs can start from $399.95, concrete planters that can range from $300-$1000(*Concrete Barriers - Concrete Jersey Barriers for Sale*, n.d.), and Our goal is to install more protection surrounding bike lanes keeping as many people as safe as possible. To be more specific, installing adequate and efficient barriers to keep cars completely separated from cyclists at the same time discouraging people from blindly crossing through bike lanes. Unfortunately, it

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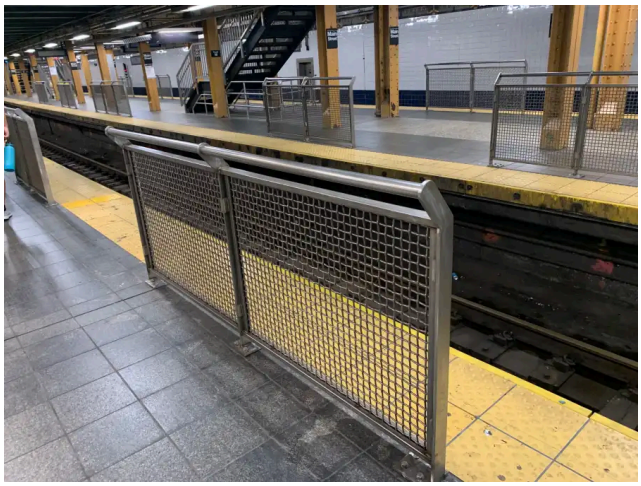
Proposed Program

2. Proposed Program: Keeping Pedestrians Out of the Way with Better Bike Lanes

Bike lanes are what protect cyclists from the deadly multi-ton marvels of human engineering; cars. Thus, bike lanes are essential in providing a means of commute for many working New Yorkers. According to the New York City Department of Transportation (DOT), in 2023 alone, approximately 61,600 New Yorkers relied on bicycles for their daily commutes (New York City Department of Transportation, 2026). And with delivery services such as Door Dash and Uber Eats offering; considering that in 2024, 2.77 million deliveries were made per week per the New York City Department of Consumer and Worker Protection; the amount of people on bike lanes is exorbitant. (New York City Department of Consumer and Worker Protection, 2024).

In 2023 alone, 52,950 citizens, including pedestrians and riders, were injured; 244 dead (DOT, 2023). Therefore, creating a clear separation between both pedestrian and rider is necessary in preventing tens of thousands of injuries. This is where guard rails come in. Like the guard rails found in many MTA subway stations (see Figure 1), a barrier separating pedestrians and bike lanes will deter pedestrians from walking onto the bike lane and risking injury or death.

Figure 1: Metal Guard Rails in Flushing Subway Station

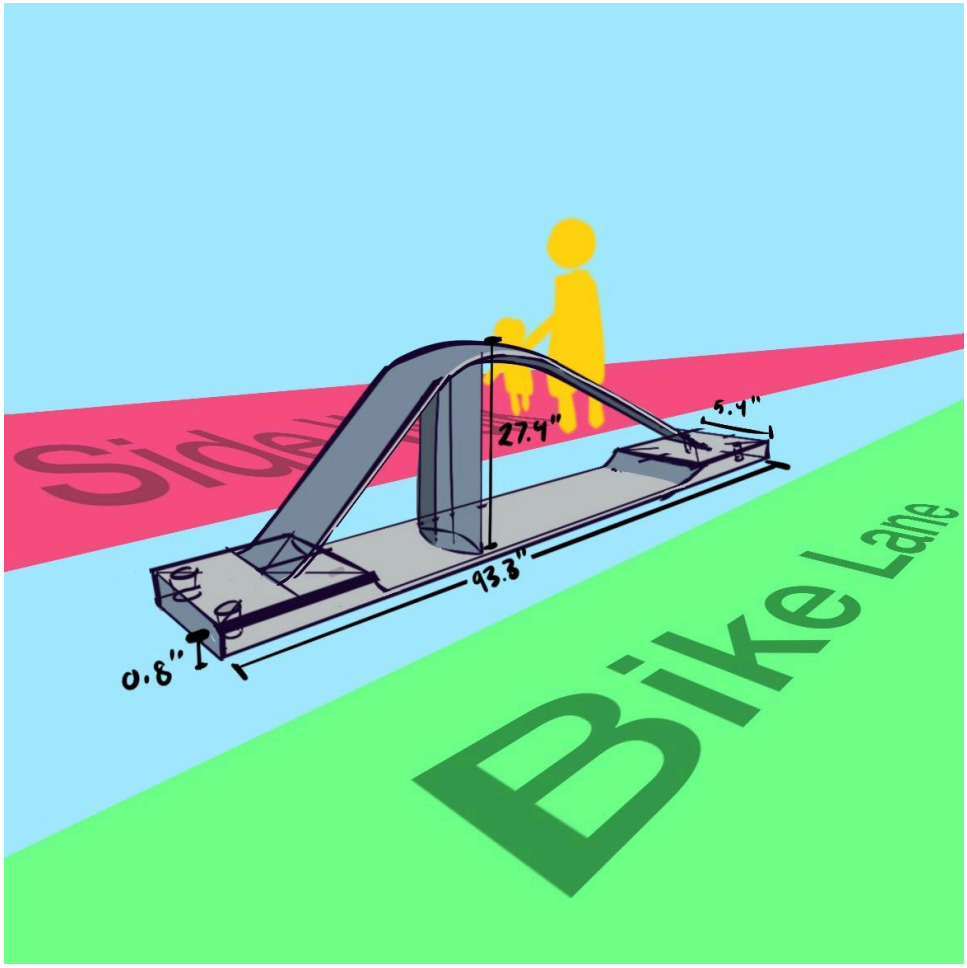


Source: [Photograph by Barbara Russo-Lennon, 2025]

However, a metal barrier like this is costly; mainly due to material costs. More importantly, metal mesh barriers could interfere with snow plowing, letting snow pile up on the bike lanes, and forcing cyclists to ride on the car lanes. Therefore a skeletal design that is ideally made out of a cheaper material like hard plastic would be more ideal for a bike lane barrier. A skeletal design would mean more opening for substances like snow to pass through, while simultaneously reducing the amount of materials needed to manufacture the barriers.

2.1. Design of The Barrier

Figure 2: Mockup of the Proposed Barrier: “Lane Splitter”.

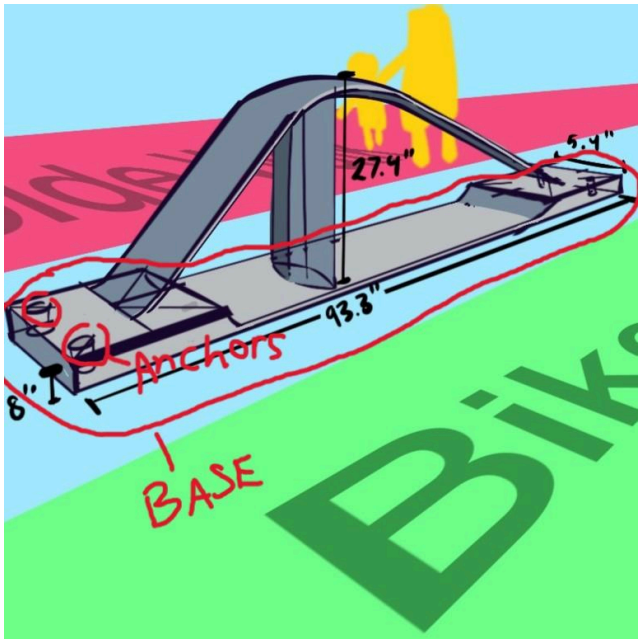


Source: Illustration by Brian Narvaez, 2026

The “Lane Splitter” is a barrier that separates the sidewalk and the bike lane. It is made of hard plastic, recycled rubber and sports a skeletal design, ensuring cheap manufacturing. Each lane splitter is laid out one after the other and screwed into the asphalt to ensure reliable security for civilians. There are three components to these lane splitters: the base, tent, and column.

2.1.1. The Base

Figure 3: Base of the Lane Splitter.

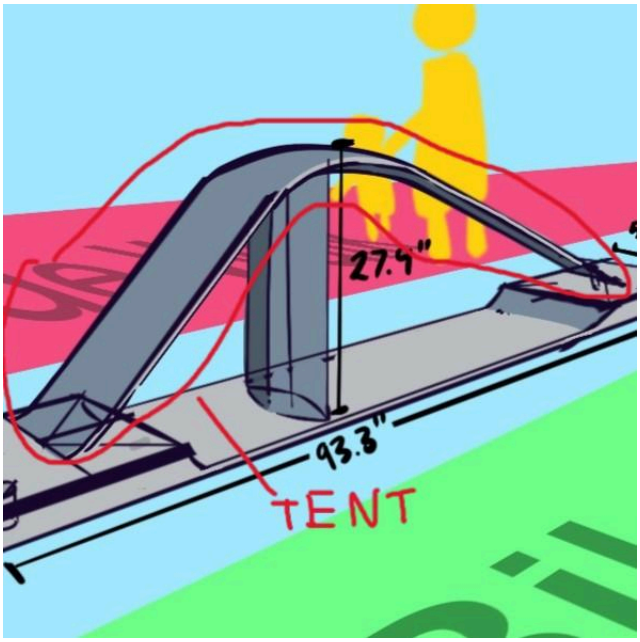


Source: Illustration by Brian Narvaez, 2026

The base of the lane splitter can get as tall as 0.8 inches and is made out of recycled rubber, similarly to the rubber used to make traffic cones. This provides an adequate foundation for the lane splitter, ensuring stability. On each end of the base, there are two large holes for the asphalt anchors (a type of screw made for asphalt) that will be driven into the asphalt, ensuring that the lane splitter is not removed without permission.

2.1.2. The Tent

Figure 4: The Tent of the Lane Splitter.

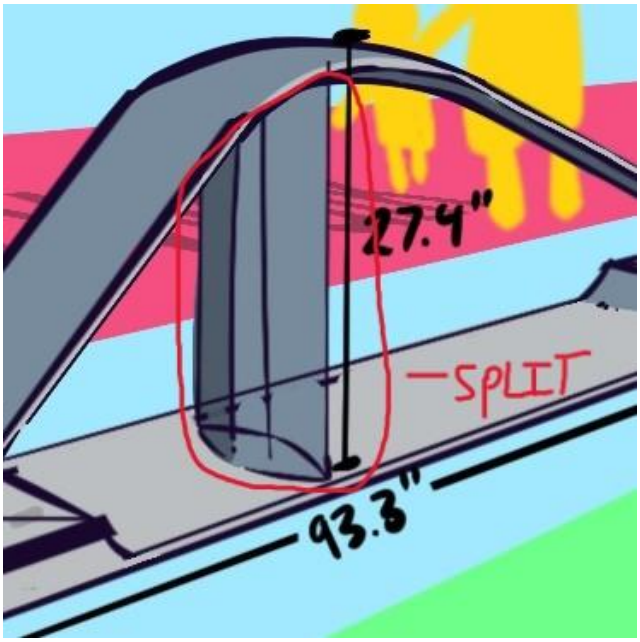


Source: Illustration by Brian Narvaez, 2026

The tent dictates the overall height of the lane splitter, reaching 27.4 inches. The tent is the crux of the lane splitter, acting as the barrier between the sidewalk and the bike lane. The tent is made out of white hard plastic, with a thickness of 0.5 inches; which is also retrofitted with reflective sheeting to provide visibility at night.

2.1.3. The Split

Figure 5: The Split of the Lane Splitter



Source: Illustration by Brian Narvaez, 2026

The split is an oval shaped column of white hard plastic that splits the underside of the tent in the middle. The split is mainly for added support for the tent, ensuring that it can't be crushed under adequate weight. The split also serves as a barrier so that children don't crawl under the tent.

2.2. The Lane Splitter in Action

Figure 6: Union Square on Broadway and East 17th Street

Source: Photograph by Brian Narvaez, 2026

Considering an open area like Union Square, installing some sort of barrier (like the Lane Splitter) between sidewalks and bike lanes could definitely improve the overall safety of that area. And it would look something like this:

Figure 7: Mockup of Lane Splitter on Broadway and East 17th Street

Source: Illustration and Photograph by Brian Narvaez

Innovation Process

Jair

This will include COST, TIME, MATERIALS, DESCRIPTION OF MATERIALS, LABOR-POWER… and all other necessary and important factors. (These components can be rough estimates and theoretical if need be. You can draw this information from the production and data of similar and previously invented innovations. Cite all research according to APA standards.)

6. Innovation Process

Cost

Example:

- materials: $40 per barrier
- labor: $15 per barrier
- installation: $10 per barrier

Total ≈ $65 each

Time

- Research: 1 week
- Design: 1 week
- Prototype: 1 week
- Presentation: 1 week

Materials

- recycled rubber
- plastic polymer
- solar lights
- bolts/anchors

Labor Power

- engineers
- construction workers
- city inspectors

Describe the barrier.

Example specs:

Material:

- recycled rubber base
- reinforced plastic shell
- reflective tape
- LED strips

Dimensions:

- 3 ft long
- 1.5 ft tall
- interlocking design

Features:

- withstand weather
- impact absorption
- easy installation
- drainage-friendly

Include:

- diagrams
- community photos
- pictures of current barriers

Cost Estimate
These barriers will be made up of ABS plastic. ABS plastic is a type of plastic. These barriers usually cost 200 pounds, but if we recycle the plastic within our city, the cost can be cut down significantly.

Time
It takes around 10 hours to produce 1 of these barriers with the 3d printing technology that we currently have available. Also, ABS plastic takes a long time to work with due to its high infill and an enclosed printer.

Materials/ Description of Materials

The material that these protective barriers are made of is plastic. More specifically, ABS thermoplastic is extremely durable and very sustainable. This is great since NYC produces large amounts of plastic waste each year. Instead of contaminating our environment with these plastics, we can recycle them and use them to produce ABS thermoplastic.

Labor Power

The people with

Appendices

Appendix #1 for intro paragraph 1: "New York is one of the most crowded cities with 27,547 residents per square mile and a total population of 8,336,817"

Rank	City	Population	Land Area (Square Miles)	Population Density
1	New York, NY	8,336,817	302.64	27,546.98
2	San Francisco, CA	881,549	46.87	18,808.38
3	Jersey City, NJ	262,075	14.79	17,719.74
4	Boston, MA	692,600	48.28	14,345.48
5	Miami, FL	467,963	35.87	13,046.08

Gregory, L. (2023, May 9)

Appendix #2 for intro paragraph 1: "heavier stuff like concrete parking curbs can start from $399.95, concrete planters that can range from $300-$1000"

Item #	Image	Description	Price
LB-48		Concrete Traffic & Safety Barrier 48", 750 lbs. • LB-48 Concrete Jersey Barrier for Traffic and Safety Applications • Forklift Knockouts for easy placement. • 48"L x 24"W x 32"H, Top of unit is 6" thick • 750 lbs. • Gray Finish • Full Truck Load is 60. • Call for freight quote. Please request a quote for shipping >> Special Pricing Available Will be shipped via: TRUCK FREIGHT – COMMERCIAL ADDRESSES ONLY	$399.95 SALE MORE DETAILS
LB-48-V		Concrete Traffic & Safety Barrier 48", 480 lbs. • VLB-48v linkable concrete traffic barriers with forklift knockouts. • 48"L x 24"W x 32"H • 480 lbs. Please request a quote for shipping >> Special Pricing Available Will be shipped via: TRUCK FREIGHT – COMMERCIAL ADDRESSES ONLY	$479.95 SALE MORE DETAILS
B-48		Concrete Traffic & Safety Barrier 48"L x 36"H x 24"W, 1600 lbs • SB-48 Concrete Safety Barrier with Forklift Knockouts • 48"L x 24"W x 36"H • 1600 lbs • Designed for heavy duty military and commercial use.	$499.95 MORE DETAILS

Concrete jersey barriers for sale. (n.d.).

Appendix #3 for intro paragraph 1:

Flexible bollards:

- Often surface-mounted to concrete or asphalt with anchors or embedded bases
- Typically used as semi-permanent or permanent fixtures as part of the site design
- Some models offer removable mounting systems, reducing subsequent replacement installation costs to zero

Traffic delineators:

- Can be permanently anchored or attached to portable, spring-loaded bases
- Frequently deployed in temporary or changing layouts (construction, events)
- Installation costs typically $60–$150, generally less expensive than bollards
- Faster to install and reposition, but often less integrated into long-term site design(Fisher)

Appendix #4 for proposed program paragraph 2: "In 2023 alone, 52,950 citizens, including pedestrians and riders, were injured; 244 dead"

	Crashes Involving Motor Vehicles (Traffic Injuries & Fatalities)									
Borough	Pedestrian Injuries	Pedestrian Fatalities	Bicyclist Injuries	Bicyclist Fatalities	Occupant Injuries	Occupant Fatalities	Other Motorized Injuries	Other Motorized Fatalities	Total Traffic Injuries	Total Traffic Fatalities
Manhattan	1,565	18	1,479	3	4,477	10	329	2	7,850	33
Bronx	1,438	18	493	3	7,013	26	316	1	9,260	48
Brooklyn	2,950	28	1,882	9	11,743	27	1,022	3	17,597	67
Queens	2,279	33	891	5	11,776	41	530	3	15,476	82
Staten Island	388	4	84	2	2,267	8	28	0	2,767	14
Citywide	8,620	101	4,829	22	37,276	112	2,225	9	52,950	244

(Bicycle Crash Data -2023

#5 Useful information that shows why this project is so important and where exactly it should be used.

Year	Total Traffic Injuries	Bicyclists Injured	%
2013	49,882	3,884	7.8%
2014	51,029	3,982	7.8%
2015	53,163	4,433	8.3%
2016	59,396	4,592	7.7%
2017	58,671	4,397	7.5%
2018	60,652	4,304	7.0%
2019	60,571	4,611	7.6%
2020	43,841	5,175	11.8%
2021	50,729	4,618	9.1%
2022	50,726	4,676	9.2%
2023	52,950	4,829	9.1%
2024	54,005	5,148	9.5%

(Goldwater,9 April 2025)

Appendix #6 for proposed program paragraph 1:approximately 61,600 New Yorkers relied on bicycles for their daily commute:

	Bike Commuters (to work)	Bike Commute Trips (to work)	Total Daily Cycling Trips*	Total Annual Cycling Trips (in millions)
2008	23,500	47,000	240,000	87.6
2009	24,400	48,800	240,000	87.6
2010	25,000	50,000	250,000	91.3
2011	26,900	53,800	270,000	98.6
2012	31,500	63,000	320,000	116.8
2013	37,600	75,200	380,000	138.7
2014	41,800	83,600	420,000	153.3
2015	45,000	90,000	450,000	164.3
2016	45,800	91,600	460,000	167.9
2017	48,800	97,600	490,000	178.9
2018	50,900	101,800	510,000	186.2
2019	52,700	105,400	530,000	193.5
2021	55,000	110,000	550,000	200.8
2022	61,200	122,400	610,000	222.7
2023	61,600	123,200	620,000	226.3

NYC DOT (N.D)

REFERENCES

Appendix #1: Gregory, L. (2023, May 9). *The Most Crowded Cities in America*. The Rent. Blog : A Renter's Guide for Tips & Advice. https://www.rent.com/blog/most-crowded-cities-in-america/

Appendix #2: *Concrete barriers - Concrete jersey barriers for sale*. (n.d.). https://www.trafficsafetywarehouse.com/Concrete-Barriers/products/85/

Appendix #3: Fisher, Ryan. "Flexible Bollards vs Traffic Delineators: What's the Difference?" *Reliance Foundry*, 5 Feb. 2026, www.reliance-foundry.com/blog/flexible-bollards-vs-traffic-delineators. Accessed 7 May 2026.

Appendix #4: *Bicycle Crash Data -2023*. 2023. https://www.nyc.gov/html/dot/downloads/pdf/bicycle-crash-data-report-2023.pdf

Appendix #5: Goldwater, Robert. "New York Bicycle Accident Statistics for 2026 | Bicycle Accident Lawyers Group." *Bicycle Accident Lawyers*, 9 Apr. 2025, bicycleaccidentlawyers.com/new-york-city/accident-statistics/. Accessed 5 May 2026.

Appendix #6"NYC DOT - Bicyclists - Ridership Statistics and Reports." *Www.nyc.gov*, www.nyc.gov/html/dot/html/bicyclists/bikestats.shtml.