

Presented by Group 7

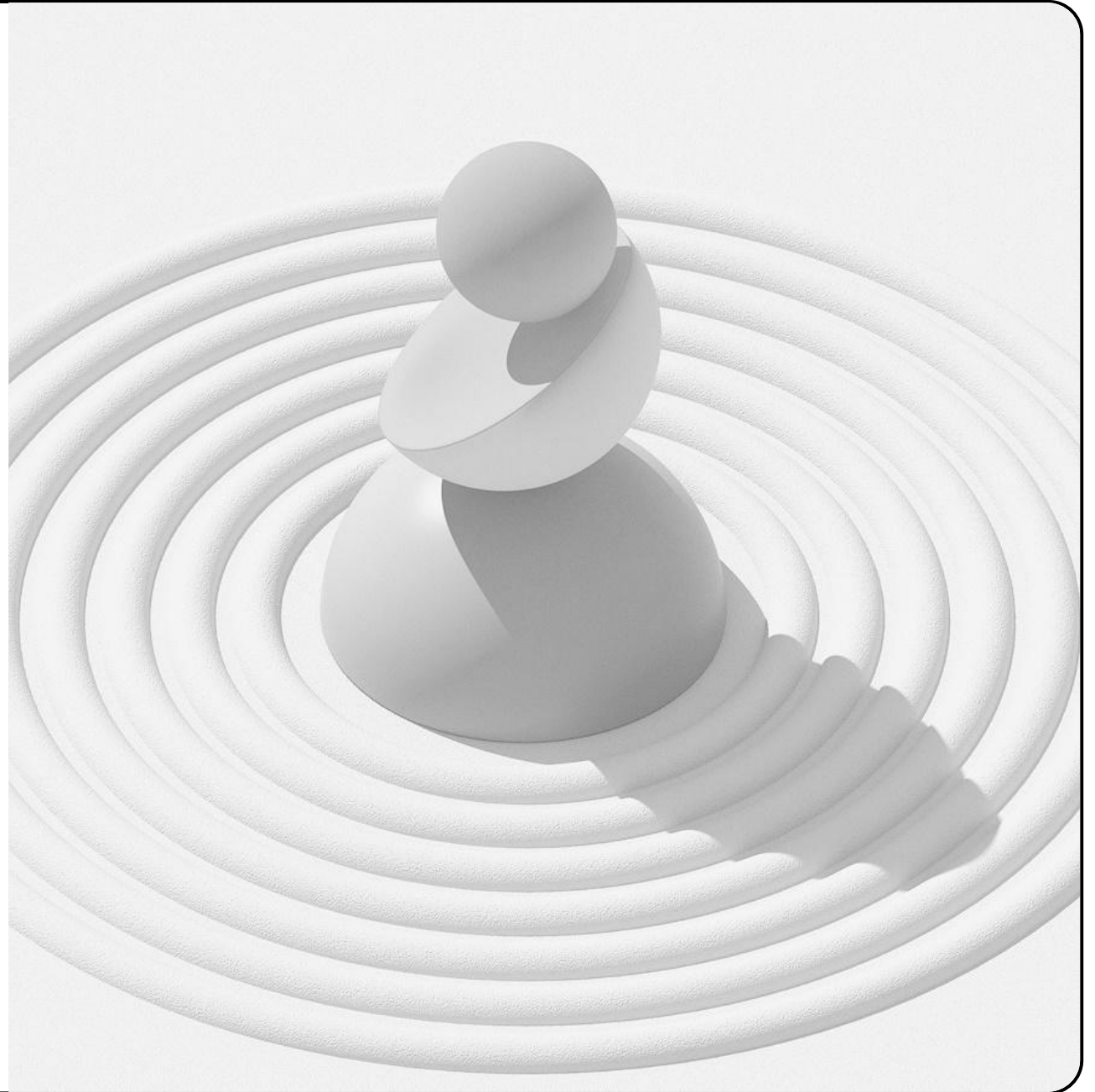
# PUBLIC SECTOR PAYROLL TRANSPARENCY & OPTIMIZATION

## EMPLOYEE EARNINGS ANALYSIS FOR CITY OF PHILADELPHIA(2019-2022)

# SUMMARY

The City of Philadelphia's workforce compensation is a major component of public expenditure. This project leverages earnings data from the One Philly payroll system (Q2 2019 - 2022) to uncover insights into employee compensation, departmental spending, job roles, and termination patterns. These insights will help support:

- Payroll budget transparency
- Departmental resource planning
- HR policy improvement
- Workforce cost optimization
- Equity in public compensation



# DATASET OVERVIEW:

- **Data Fields**

Earnings Data

Employee Info

Department Info

Time Dimension

- **DESCRIPTION**

Salary, overtime, longevity, bonuses, post-separation pay

Job title, job code, employee category, salaried/non-salaried

Department name & code

Calendar year, quarter, separation year/month

# SOURCE OF DATA

**Dataset Name:**

Employee Earnings (2019 Q2 – 2022)

**Publisher:**

City of Philadelphia

**Source Link:**

<https://www.phila.gov/data/>  
(Search: "Employee Earnings")

**Departments Involved:**

- Office of Human Resources
- Office of the Director of Finance

# TOOLS

## ❑ MICROSOFT EXCEL

For initial data cleaning, transformation, and exploring data types.

## ❑ POWER BI

For building interactive dashboards with custom KPIs, visualization, filters, and calculated columns.

# PROBLEM STATEMENT

- Ensure **fair, transparent compensation**
- Identify departments or roles with **unusual payroll spikes**
- Track **separation and post-separation payouts** to inform HR strategies
- **Optimize workforce costs** while maintaining equity

# KEY TRACKING METRICS

## METRIC

Total Gross Pay

Average Pay per Department

Overtime Dependence

Longevity Pay Ratio

Separation Rate

Post-Separation Cost

## DESCRIPTION

Sum of all gross pay components

Total gross pay / employee count per department

% of earnings from overtime per department

Longevity pay as % of total earnings

% of employees who left that quarter

Total post-separation pay by department

# DATA CLEANING SUMMARY

## 1. Data Type Formatting

- Changed the following fields to **Whole Number**:
  - Quarter
  - Department Number
  - Public ID
- Formatted the following fields as **Currency**:
  - Base Salary
  - Overtime Gross Pay QTD
  - Base Gross Pay QTD
  - Longevity Gross Pay QTD
  - Miscellaneous Gross Pay QTD

## 2. Column Renaming and Reordering

- Renamed columns:
  - Title → Job Title
  - Employment Status → Employee Status
- Reordered columns to follow a more **standard and readable structure**

## 3. Handling Missing Values

- Replaced all **null values** with **0** for transparency
- Exception: Left nulls in the **Base Gross Pay** field to indicate **non-salaried employees**



# RAW DATASET

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	CALENDAR	QUARTER	FIRST_NAME	LAST_NAME	JOB_TITLE	JOB_CODE	DEPARTMENT	DEPARTMENT	BASE_SAL	SALARY_T	OVERTIME	BASE_GRC	LONGEVIT	POST_SEP	MISCELLAN	EMPLOYEE	COMPULS	TERMINAT	TERMINAT	PUBLIC_ID
2	2019	3	Jamill	Taylor	Police Insp	6A09	PPD Police	11	125492	Salaried		33342.15	2504.99		7540.92	Civil Servi	P			1
3	2020	3	Peter	Hammond	Firefighter	6B01	PFD Fire	13	78092	Salaried	9417.23	20937.25	2054.9		3297.92	Civil Servi	F			2
4	2021	4	Samuel	Shiple	Fiscal Tech	F423	FJD 1st Juc	84	51004	Salaried		13679.26	274.96		1456	Exempt	C			3
5	2021	4	Thepphak	Vongnarat	Network S	1D55	FLP Free Li	52	64549	Salaried		16337.1			0	Civil Servi	J			4
6	2022	1	Walter	Beattie	Criminal In	6C22	PPD Police	11	70334	Salaried	2622.96	16438.29	169.4		73.2	Civil Servi	J			5
7	2021	1	Ricky	Stewart	Office Cle	1A03	PPD Police	11	37130	Salaried		9019.54	143.7		0	Civil Servi	M			6
8	2021	3	Kevin	Norton	Water Ope	7B01	PWD Wate	28	40288	Salaried	493.96	9776.7	159.36		187.1	Civil Servi	M			7
9	2019	3	Jeffrey	Chu	Law Clerk	L091	FJD 1st Juc	84	57069	Salaried		10441.92			-27.06	Exempt	C	12	2019	8
10	2020	2	Karen	Graves	Social Wor	5A07	DHS Dept	22	65712	Salaried		14906.25	188.94		475	Civil Servi	J			9
11	2020	3	Saleem	Muhamma	L & I Build	6H90	LNI Licens	26	58290	Salaried		15623.63	167.56		0	Civil Servi	M			10
12	2020	1	Johnny	Calhoun	Custodial	7D12	COM Com	42	37040	Salaried	6760.06	10697.48	294.59		275.32	Civil Servi	M			11
13	2021	1	Lynn	Williamso	Administr	9B62	FLP Free Li	52	102110	Salaried		23473.91	327.6		0	Civil Servi	N			12
14	2021	3	Hector	Martinez	Heavy Equ	7C13	STS Street	12	48063	Salaried	2099.32	11012.53	283.57		0	Civil Servi	M			13
15	2019	3	William	Schenk Jr	Court Adm	C575	FJD 1st Juc	84	77535	Salaried		17126.16	143.16		0	Exempt	C			14
16	2022	1	Johanna	Giles	Recreation	R301	PPR Parks	16		Non-Salaried		3284.74			0	Exempt	S			15
17	2019	3	Mike	James	Recreation	R301	PPR Parks	16		Non-Salaried		396.8			0	Exempt	S	3	2020	16
18	2022	1	Robert	Killman	Police Off	6A02	PPD Police	11	80240	Salaried	5043.85	18446.4	1419.29		1409.44	Civil Servi	P			17
19	2022	2	Charmaine	Taylor	Police Con	6J32	PPD Police	11	49265	Salaried	302.02	8418.71	252.26		42.1	Civil Servi	M			18
20	2019	2	Charles	Golden	Solicitor	S422	ROW Regi	68	78000	Salaried		18000			0	Exempt	E	2	2020	19
21	2020	1	Eric	Jenkins	Correction	5H04	PPS Prison	23	50070	Salaried	3094.36	13759.92	708.18		530.74	Civil Servi	I			20
22	2020	2	Marguerite	Morgan	Fiscal Off	2A33	PFD Fire	13	102110	Salaried		23290.29	282.12		629.77	Civil Servi	N			21
23	2019	3	Beverly	Kelly	Social Ser	5A80	OSH Ofc of	24	67274	Salaried		17919.02	274.21		0	Civil Servi	J	2	2020	22
24	2020	1	Mary	Westbrook	Librarian	29B03	FLP Free Li	52	61740	Salaried	1278.82	14450.73	209.62		5.1	Civil Servi	J			23
25	2019	2	Rotha	Sor	Collection	2B02	REV Rever	36	39810	Salaried	614.63	8838.33			0	Civil Servi	M			24
26	2020	2	Katelynn	Harper	Police Off	6A02	PPD Police	11	70282	Salaried	2686.01	15846.81			2191.55	Civil Servi	P			25
27	2021	3	Bertha	Hines	School Crc	6D44	PPD Police	11	12960	Salaried		777.6	52.88		1134	Civil Servi	G			26
28	2022	2	Karen	Guss	Deputy Dir	D295	DPD Plann	72	113000	Salaried		24862.47			0	Exempt	E			27
29	2020	2	Crystal	Crum	Social Ser	5A80	DHS Dept	22	68619	Salaried		15566.18	234.78		475	Civil Servi	J			28
30	2021	4	James	Mcquiggar	Police Off	6A02	PPD Police	11	77031	Salaried	15100.07	21110.1	1267.49		2372.65	Civil Servi	P			29
31	2022	1	Christophe	Schnabel	Fire Servic	6B21	PFD Fire	13	66868	Salaried	1372.45	14276.58	873.23		5296.93	Civil Servi	F			30

# CLEANED DATASET

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	PUBLIC_ID	FIRST_NAME	LAST_NAME	JOB_TITLE	JOB_CODE	CALENDAR_YEAR	QUARTER	DEPARTMENT_NUMBER	DEPARTMENT_NAME	EMPLOYEE_CATEGORY	BASE_SALARY	SALARY_TYPE	OVERTIME_GROSS_PAY_QTD
2	1	Jamill	Taylor	Police Inspector	6A09	2019	3	11	PPD Police	Civil Service	125492	Salaried	0
3	2	Peter	Hammond	Firefighter	6B01	2020	3	13	PPD Fire	Civil Service	78092	Salaried	9417.23
4	3	Samuel	Shipley	Fiscal Technician 3	F423	2021	4	84	FJD 1st Judicial District PA	Exempt	51004	Salaried	0
5	4	Thepphakhone	Vongnarath	Network Support Specialist	I055	2021	4	52	FLP Free Library of Phila	Civil Service	64549	Salaried	0
6	5	Walter	Beattie	Criminal Investigative Research Lead Specialist	6C22	2022	1	11	PPD Police	Civil Service	70334	Salaried	2622.96
7	6	Ricky	Stewart	Office Clerk 2	1A03	2021	1	11	PPD Police	Civil Service	37130	Salaried	0
8	7	Kevin	Norton	Water Operations Repair Helper	7B01	2021	3	28	PWD Water	Civil Service	40288	Salaried	493.96
9	8	Jeffrey	Chu	Law Clerk 1	L091	2019	3	84	FJD 1st Judicial District PA	Exempt	57069	Salaried	0
10	9	Karen	Graves	Social Work Services Manager 2	5A07	2020	2	22	DHS Dept of Human Services	Civil Service	65712	Salaried	0
11	10	Saleem	Muhammad	L & I Building Inspector	6H90	2020	3	26	LNI Licenses and Inspections	Civil Service	58290	Salaried	0
12	11	Johnny	Calhoun	Custodial Worker 2	7D12	2020	1	42	COM Commerce - Division of Aviation	Civil Service	37040	Salaried	6760.06
13	12	Lynn	Williamson	Administrative Librarian 2	9B62	2021	1	52	FLP Free Library of Phila	Civil Service	102110	Salaried	0
14	13	Hector	Martinez	Heavy Equipment Operator 1	7C13	2021	3	12	STS Streets	Civil Service	48063	Salaried	2099.32
15	14	William	Schenk Jr	Court Administrative Officer 5 N U	C575	2019	3	84	FJD 1st Judicial District PA	Exempt	77535	Salaried	0
16	15	Johanna	Giles	Recreation Specialty Instructor	R301	2022	1	16	PPR Parks and Recreation	Exempt		Non-Salaried	0
17	16	Mike	James	Recreation Specialty Instructor	R301	2019	3	16	PPR Parks and Recreation	Exempt		Non-Salaried	0
18	17	Robert	Killman	Police Officer 1	6A02	2022	1	11	PPD Police	Civil Service	80240	Salaried	5043.85
19	18	Charmaine	Taylor	Police Communication Dispatcher	6J32	2022	2	11	PPD Police	Civil Service	49265	Salaried	302.02
20	19	Charles	Golden	Solicitor	S422	2019	2	68	ROW Register of Wills	Exempt	78000	Salaried	0
21	20	Eric	Jenkins	Correctional Officer	5H04	2020	1	23	PPS Prisons	Civil Service	50070	Salaried	3094.36
22	21	Marguerite	Morgan	Fiscal Officer	2A33	2020	2	13	PPD Fire	Civil Service	102110	Salaried	0
23	22	Beverly	Kelly	Social Service/Housing Program Analyst	5A80	2019	3	24	OSH Ofc of Homeless Services	Civil Service	67274	Salaried	0
24	23	Mary	Westbrook	Librarian 2	9B03	2020	1	52	FLP Free Library of Phila	Civil Service	61740	Salaried	1278.82
25	24	Rotha	Sor	Collection Customer Representative	2B02	2019	2	36	REV Revenue	Civil Service	39810	Salaried	614.63
26	25	Katellynn	Harper	Police Officer 1	6A02	2020	2	11	PPD Police	Civil Service	70282	Salaried	2686.01
27	26	Bertha	Hines	School Crossing Guard	6D44	2021	3	11	PPD Police	Civil Service	12960	Salaried	0
28	27	Karen	Guss	Deputy Director	D295	2022	2	72	DPD Planning and Development	Exempt	113000	Salaried	0
29	28	Crystal	Crum	Social Service/Housing Program Analyst	5A80	2020	2	22	DHS Dept of Human Services	Civil Service	68619	Salaried	0
30	29	James	Mcquiggan	Police Officer 1	6A02	2021	4	11	PPD Police	Civil Service	77031	Salaried	15100.07
31	30	Christopher	Schnabel	Fire Service Emergency Medical Technician	6B21	2022	1	13	PPD Fire	Civil Service	66868	Salaried	1372.45
32	31	Cynthia	Gregg	Court Administrative Officer 3 N U	C573	2021	3	84	FJD 1st Judicial District PA	Exempt	61621	Salaried	0
33	32	Shawn	Leach	Police Officer Recruit	6A01	2019	2	11	PPD Police	Civil Service	52873	Salaried	0
34	33	Sean	O Malley	Police Officer 1	6A02	2019	4	11	PPD Police	Civil Service	76187	Salaried	0
35	34	John	Etim	Real Property Evaluator 2	2D17	2021	1	59	OPA Ofc of Property Assessment	Civil Service	68619	Salaried	0
36	35	Brandon	Dougherty	Election And Voter Reg Aide	1B61	2019	2	73	CMS City Commissioners	Civil Service		Non-Salaried	0
37	36	...	...	...	...	...	...	...	...	...	...	...	...

EMPLOYEE EARNINGS

Sheet1



SQL Server Management Studio 20

# EDA-DATA AGGREGATION

	A	B	C	D	E	F	G	H	I
1		<b>Payroll Spending Overview</b>			<b>Overtime Analysis</b>				
2									
3		Total Payroll by Year			Departments with the highest % of overtime			Non-base earnings % by job role	
4		<b>Calendar_Year</b>	<b>Sum of TOTAL_GROSS_PAY_Q</b>		<b>Departments</b>	<b>Sum of OVERTIME</b>		<b>Row Labels</b>	<b>Sum of NON_BASE_EARNINGS</b>
5		2019	\$23.87M		PFD Fire	24.9%		Correctional Officer	\$1.40M
6		2020	\$35.63M		PPD Police	37.0%		Detective	\$1.24M
7		2021	\$40.26M		PPS Prisons	15.0%		Fire Lieutenant	\$1.30M
8		2022	\$18.91M		PWD Water	10.0%		Firefighter	\$3.59M
9		<b>Grand Total</b>	<b>\$118.67M</b>		STS Streets	13.0%		Police Officer 1	\$6.51M
10					<b>Grand Total</b>	<b>100.0%</b>		<b>Grand Total</b>	<b>\$14.04M</b>
11		Total gross pay for all employees							
12		<b>Job Title</b>	<b>Sum of TOTAL_GROSS_PAY_Q</b>		Roles relying heavily on non-base earnings				
13		Correctional Officer	\$4.43M		<b>Job Title</b>	<b>Sum of NON_BAS</b>			
14		Detective	\$3.81M		Correctional Officer	\$1.40M			
15		Firefighter	\$10.88M		Detective	\$1.24M			
16		Police Officer 1	\$24.07M		Fire Lieutenant	\$1.30M			
17		Police Sergeant	\$4.32M		Firefighter	\$3.59M			
18					Police Officer 1	\$6.51M			
19		Breakdown by department							
20		<b>Department</b>	<b>Sum of TOTAL_GROSS_PAY_Q</b>		Highlight miscellaneous pay				
21		PPD Police	\$38.66M		<b>Department</b>	<b>Sum of MISCELLA</b>			
22		PFD Fire	\$19.41M		COM Commerce - Division of Aviation	\$86.59K			
23		PWD Water	\$6.66M		FJD 1st Judicial District PA	\$98.88K			
24		FJD 1st Judicial District	\$6.37M		PFD Fire	\$2.25M			
25		PPS Prisons	\$6.02M		PPD Police	\$3.58M			
26					PPS Prisons	\$132.43K			
27		<b>Who earns the most (roles &amp; departments)?</b>							
28		DEPARTMENT	PPD Police						
29		ROLE	Police Officer 1						

# FEATURE ENGINEERING

TOTAL_GROSS_PAY_QTD
IS_ACTIVE
IS_SALARIED
OVERTIME_RATIO
POST_SEPARATION_FLAG
TERMINATION_MONTH_YEAR
LONGEVITY_RATIO



# DATA VISUALIZATION 1

## CITY OF PHILADELPHIA PAYROLL INSIGHTS

Payroll trends and workforce costs across departments from 2019 to 2022.

2019

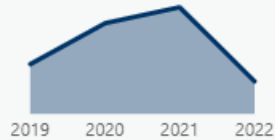
2020

2021

2022

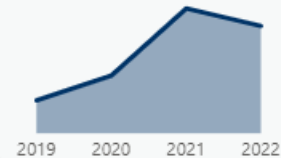
### TOTAL PAYROLL

\$118.7M



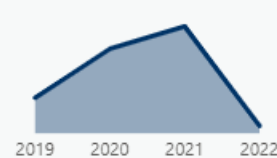
### AVG. SALARY

\$64.2K



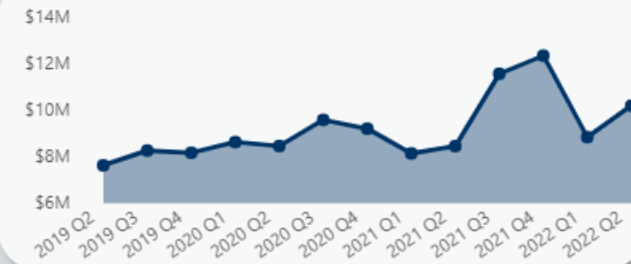
### TOTAL EMPLOYEE

6318



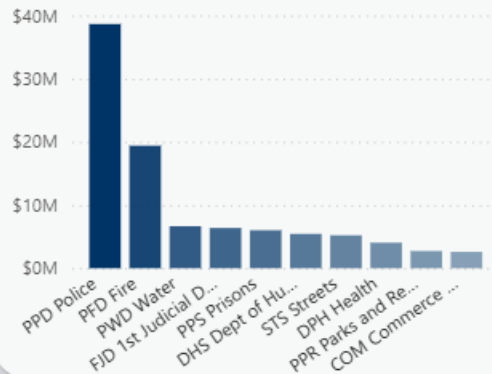
### PAYROLL TREND BY YEAR-QUARTER

Shows year-over-year changes in total payroll



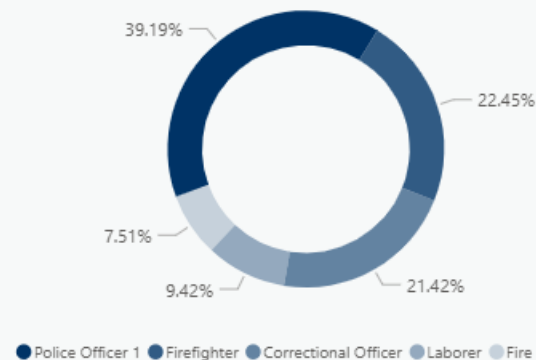
### TOTAL PAY PER DEPT. (TOP 10)

Displays the 10 departments with the highest pay



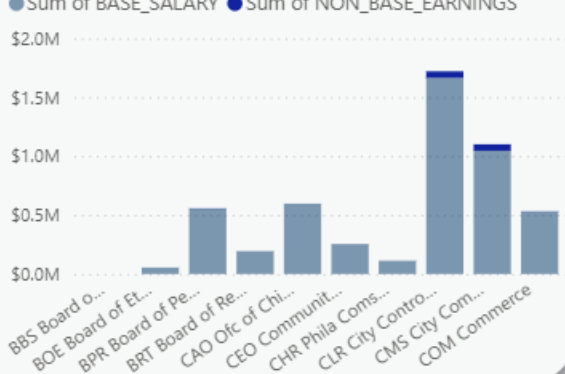
### % OF STAFF WITH HEAVY OVERTIME

Percentage of staffs logging high overtime hours



### BASE VS OVERTIME PAY BY DEPT.

Compares base salary and overtime pay across departments.



# DATA VISUALIZATION 2

## CITY OF PHILADELPHIA PAYROLL INSIGHTS

Payroll trends and workforce costs across departments from 2019 to 2022.

2019

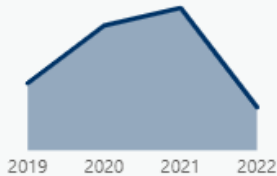
2020

2021

2022

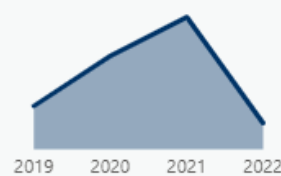
### NON BASE

\$23.7M



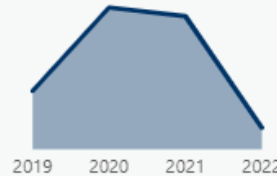
### OVERTIME

\$13.8M



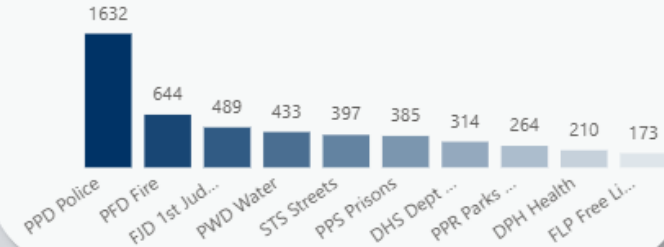
### MISCELLANEOUS

\$6.6M



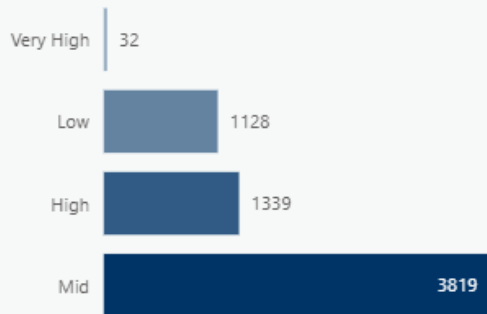
### COUNT OF EMPLOYEES BY DEPARTMENT

Total number of employees in each department,



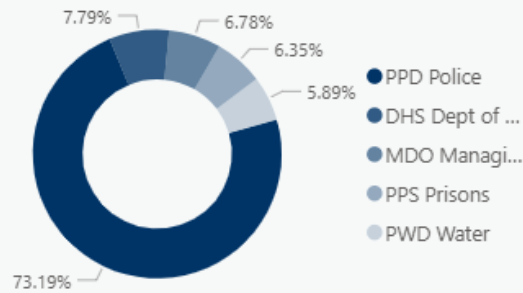
### EMPLOYEE COUNT BY SALARY BUCKET

Breakdown of employee count by salary category



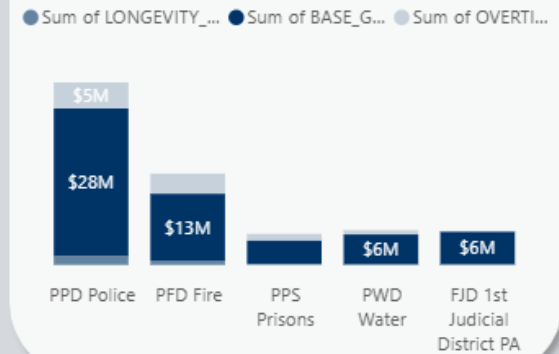
### SHARE OF POST SEPARATION BY DEPT.

Shows the proportion of employee separations by dept.



### LONGEVITY, OVERTIME VS BASE PAY

Compares regular salary to compensation





# REPORT SUMMARY

## Project Summary

- This project analyzed the City of Philadelphia Employee Earnings from Q2 2019 to 2022, based on quarterly payroll data from the One Philly system.
- The goal was to uncover insights into payroll spending, workforce structure, and non-base earnings trends across departments and job roles.
- The analysis focused on:
  - Department level payroll breakdowns
  - Roles with high overtime reliance
  - Distribution of employee counts by department
  - Identifying data gaps and pay anomalies
- Key data preparation steps included:
  - Formatting salary and numeric fields
  - Renaming and reordering columns for clarity
  - Replacing missing values appropriately
- The insights gained from this project can support budget planning, staffing decisions, and pay policy evaluation across city departments.

# KEY INSIGHTS

- Total Payroll Over 4 Years: \$118.7M**

Payroll grew year-over-year but declined in 2022, possibly due to reduced headcount or efficiency adjustments.

- PPD and Fire Department Dominate Payroll**

Security focused departments lead in payroll spending, with the Police Department notably ahead due to size, rank, and tenure.

- Heavy Overtime Use Among Security Roles**

Police Officers, Firefighters, and Correctional Officers record high overtime hours expected but important for budgeting oversight.

- Overtime Controlled but Should Be Monitored**

Overtime makes up around 4% of Police salaries not excessive, yet still worth tracking for long-term sustainability.

- Longevity Pay Is Not Insignificant**

Accumulated longevity pay reflects a substantial number of long-serving staff, particularly in legacy departments like the Police.

- Post-Separation Costs Are Unevenly Distributed**

Certain departments show higher post-separation payouts, possibly due to retirements, layoffs, or settlements may warrant HR policy review.

- Pay Gaps Evident Across Salary Buckets**

Many employees fall into mid or lower-income brackets, suggesting pay inequality that may impact morale and retention.



# RECOMMENDATIONS

- Review High-Earning Departments for Efficiency**

Conduct regular evaluations of Police and Fire Departments to ensure payroll spending aligns with performance, not just tenure.

- Balance Workload to Reduce Overtime Dependency**

Investigate high overtime usage to determine if it's caused by understaffing or poor shift allocation; restructure as needed.

- Monitor Longevity Pay for Signs of Workforce Aging**

Rising longevity costs may indicate upcoming waves of retirement initiate succession planning early.

- Promote Pay Transparency and Equity**

Leverage salary bucket and pay composition data to identify and correct internal pay disparities.

- Use Dashboard for Ongoing Planning**

Encourage Finance and HR teams to utilize the dashboard regularly for tracking trends, identifying anomalies, and informing quarterly budgeting decisions.