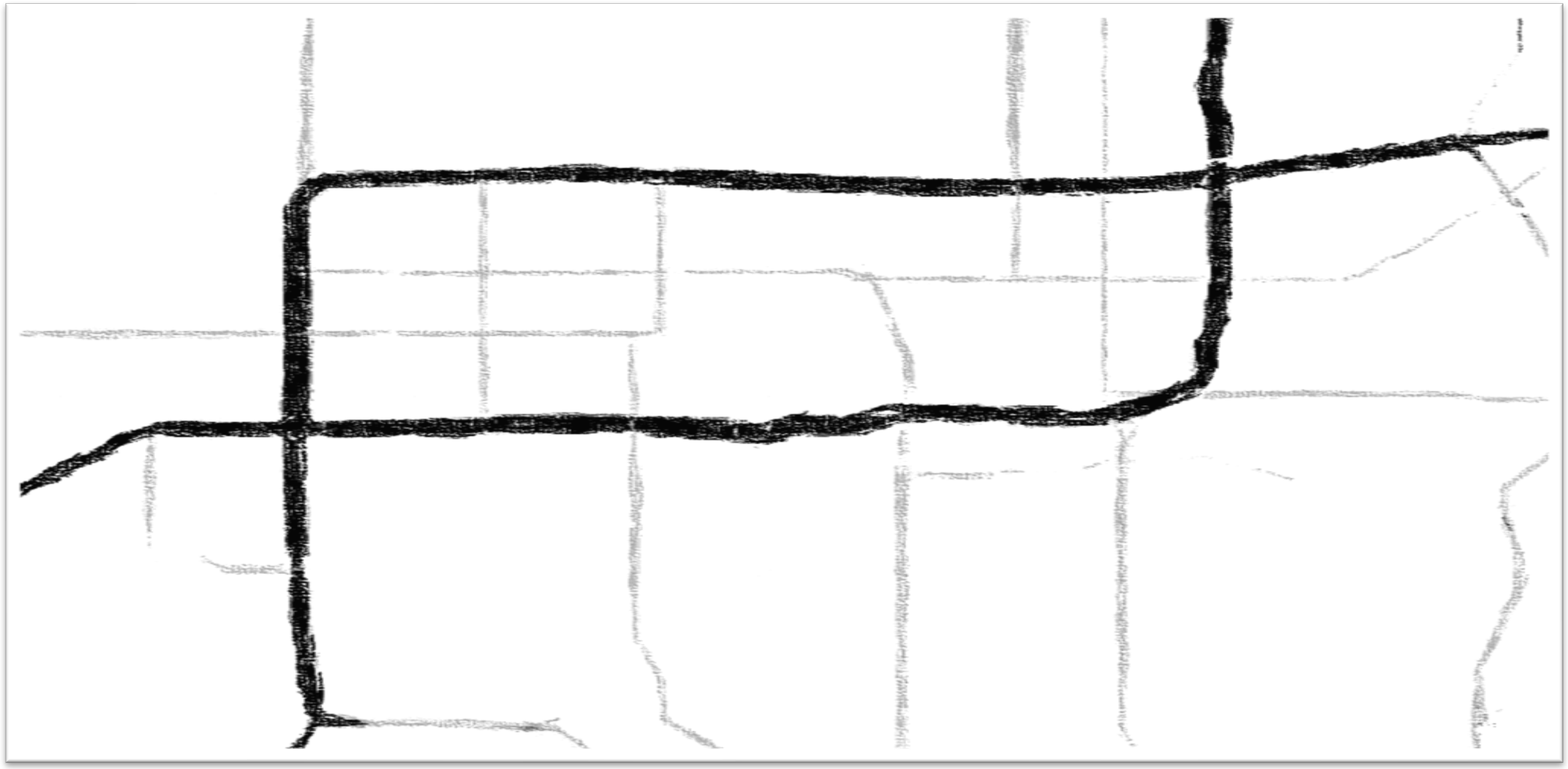


ISMS Script and Process Changes for DMAMPO Model Update

September 4, 2019

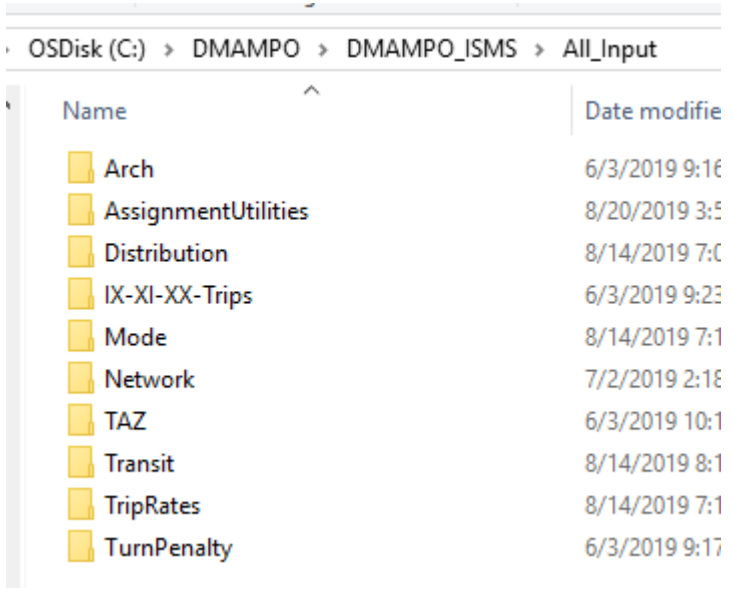
WHY MAKE CHANGES TO A STANDARD MODEL PROCESS

- Each urban area is unique
- Data availability
- Intent is to continue updating and improving

- Outline
  - Original Method
  - Why?
  - DMAMPO Method

NEW INPUT PARAMETERS

- Original Method
  - ISMS defaults or INRCOG inputs

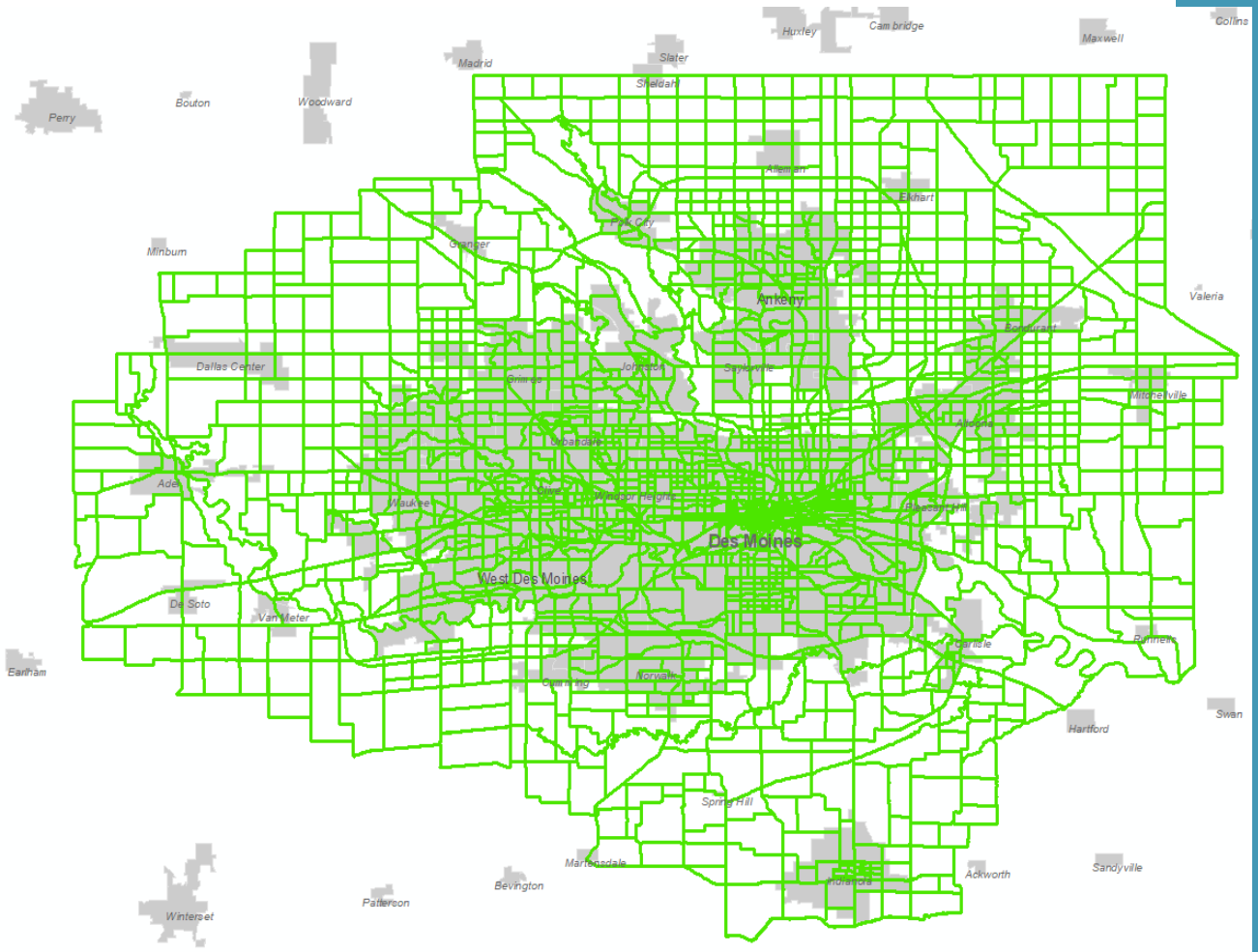


- Why?
  - NHTS Add-on availability
  - Four Time Periods

- DMAMPO Method
  - Inputs changed:
  - dirparm.bin, auto_occupancy.bin, non_motorized.bin, caplookup,bin, A_rates.bin, P_rates.bin

RURAL TRIPS REDUCTION

- Original Method
  - No reduction
- Why?
  - Rural trip rates are generally known to be lower
  - Model assigned too many trips in rural areas
  - Significant amount of rural area in model
- DMAMPO Method
  - 10% reduction applied to total trip productions and attractions by time period



FUTURE NON-RESIDENTIAL LAND USE PROCESSING

- Original Method:
  - Specific land use growth assigned to individual parcel in AMT1, AMT2, or AMT3 fields, and LUC1, LUC2, or LUC3 fields
- Why?
  - Employment growth processed into parcels
  - Required conversion to several non-residential land uses
  - Original process only allowed one land use per parcel
- DMAMPO Method:
  - Each parcel has five future land use categories

Attribute	Format	Description
EMP (-)	Real	Employment forecast for all employment categories for 2030, 2040, and 2050
FPUB20XX (-)	Real	Future public/government/church/recreational land for 2030, 2040 and 2050 in ksf
FSPI20XX (-)	Real	Future semi-public/institutional land for 2030, 2040 and 2050 in ksf
FOFF20XX (-)	Real	Future office land for 2030, 2040 and 2050 in ksf
FCOM20XX (-)	Real	Future commercial land for 2030, 2040 and 2050 in ksf
FIND20XX (-)	Real	Future industrial land for 2030, 2040 and 2050 in ksf

Original Method

Dataview1 - DMAMPO_Parcels_20180

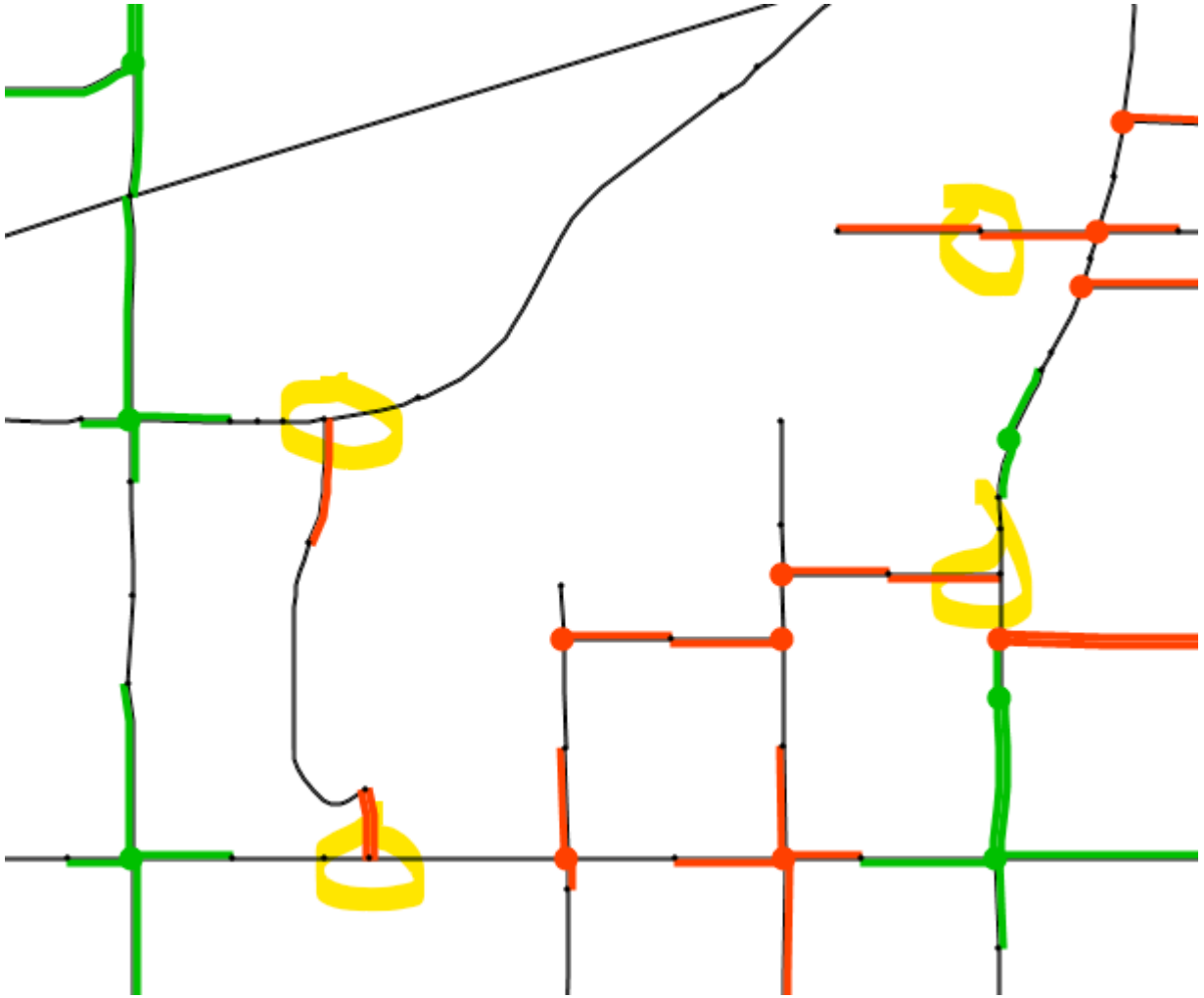
YEAR	YEAR1	YEAR2	YEAR3	LUNAME	LUC	LUC1	LUC2	AMT	AMT1	AMT2	AMT3	LUC3	
0	--	--	--	AG	96	--	--	0.72244394684	0.00000000000	0.00000000000	0.00000000000	--	0.
0	2030	2040	2050	AG	96	--	--	0.09411820645	0.00000000000	0.00000000000	0.00000000000	--	0.
0	--	--	--	AG	96	--	--	0.92903476054	0.00000000000	0.00000000000	0.00000000000	--	0.
0	2030	2040	2050	AG	96	--	--	0.92903557460	0.00000000000	0.00000000000	0.00000000000	--	0.
0	--	--	--	AG	96	--	--	0.92903617053	0.00000000000	0.00000000000	0.00000000000	--	0.
0	--	--	--	AG	96	--	--	0.75544698466	0.00000000000	0.00000000000	0.00000000000	--	0.
0	2030	2040	2050	AG	96	--	--	0.92903557460	0.00000000000	0.00000000000	0.00000000000	--	0.
0	2030	2040	2050	AG	96	--	--	0.59432574949	0.00000000000	0.00000000000	0.00000000000	--	0.
0	2030	2040	2050	AG	96	--	--	0.48756777645	0.00000000000	0.00000000000	0.00000000000	--	0.

DMAMPO Method

Dataview1 - DMAMPO_Parcels_20180

FPUB1	FPUB2	FPUB3	FSPI1	FSPI2	FSPI3	FOFF1	FOFF2	FOFF3	FCOM1	FCOM2	FCOM3	FIN
0.00000000000	0.00000000000	2.76625670053	0.00000000000	0.00000000000	0.73175352659	0.00000000000	0.00000000000	5.42195637104	0.00000000000	0.00000000000	0.71796902958	0.000000000
0.00000000000	0.00000000000	4.96048223370	0.00000000000	0.00000000000	9.84468829813	0.00000000000	0.00000000000	2.06830980214	0.00000000000	0.00000000000	9.01566082335	0.000000000
0.00000000000	0.00000000000	4.36454572855	0.00000000000	0.00000000000	2.87691170268	0.00000000000	0.00000000000	0.72180796174	0.00000000000	0.00000000000	6.72577195360	0.000000000
0.00000000000	0.00000000000	3.98377880058	0.00000000000	0.00000000000	0.51284401573	0.00000000000	0.00000000000	3.47924291409	0.00000000000	0.00000000000	8.98455494739	0.000000000
0.00000000000	0.00000000000	6.63073968519	0.00000000000	0.00000000000	6.56094341652	0.00000000000	0.00000000000	1.37218806546	0.00000000000	0.00000000000	9.32739813040	0.000000000
0.00000000000	0.00000000000	2.06040325972	0.00000000000	0.00000000000	5.52011620820	0.00000000000	0.00000000000	8.18350662402	0.00000000000	0.00000000000	1.51647906456	0.000000000
0.00000000000	0.00000000000	8.52130646242	0.00000000000	0.00000000000	2.43678513343	0.00000000000	0.00000000000	8.73740404591	0.00000000000	0.00000000000	8.37752834774	0.000000000
0.00000000000	0.00000000000	2.86417613330	0.00000000000	0.00000000000	8.87110293113	0.00000000000	0.00000000000	7.81356906772	0.00000000000	0.00000000000	1.61875909776	0.000000000
0.00000000000	0.00000000000	7.94649728766	0.00000000000	0.00000000000	7.75117357192	0.00000000000	0.00000000000	4.38255003317	0.00000000000	0.00000000000	3.21421556327	0.000000000

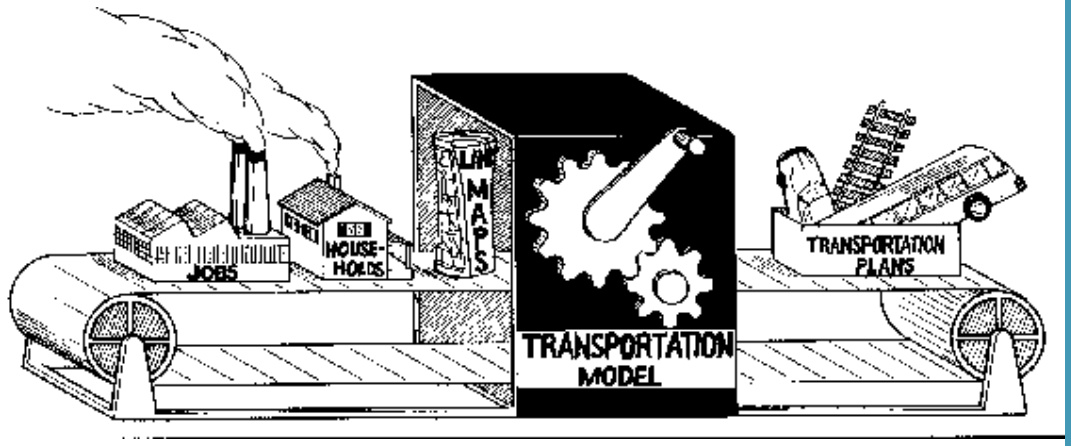
TURNTYPE PROCESSING STEPS



- Original Method
  - Node and approaching network direction intersection control info needed to match
- Why?
  - Large network with some node and network intersection coding mismatches
- DMAMPO Method
  - Approaching network intersection info is all that matters

ADJUSTED FLOW FIELDS

- Original Method
  - Calculated difference and ratio of actual counts to model flows only
- Why?
  - Desire to use synthetic counts in adjusted flow calculation
- DMAMPO Method
  - First adjusts using actual counts
  - Then uses synthetic counts
  - Then fills in model-estimated flows wherever synthetic counts are missing
  - Fields: AB_FCST, BA_FCST, TOT_FCST on output road network



http://www4.uwm.edu/cuts/primer.htm

CENTER TURN LANE CODING

- Original Method
  - ISMS *reduces* capacity on a road if a center turn lane exists
  - Assign extra lane to AB_BLANES or BA_BLANES fields (integer datatype)

- Why?
  - Need an increase in through lanes to account for reduction
  - Capacity should be increased in *both* directions

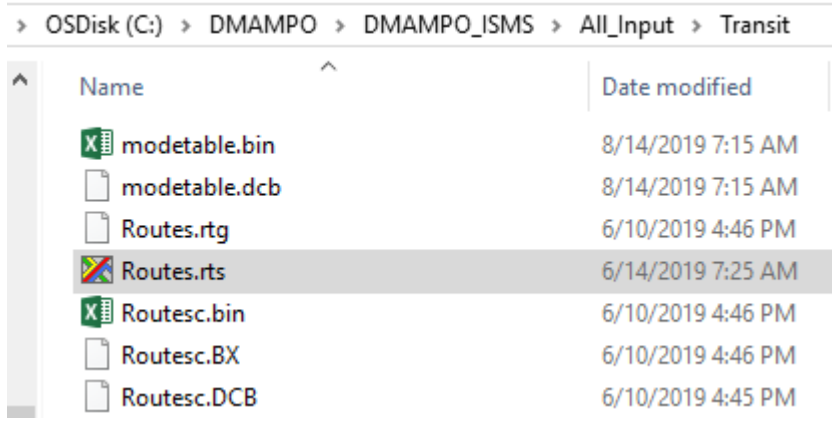
- DMAMPO Method
  - Changed AB_BLANES and BA_BLANES fields to Real datatype
  - Assign extra ½ lane in each direction

Table 4-54: Capacity Reduction Factors for Links Along Interrupted Facilities

MEDIAN TYPE	CAPACITY REDUCTION (PC/HR/LN)	ACCESS LEVEL	CAPACITY REDUCTION (PC/HR/LN)
1-Wide divided	0	1-No access	0
2-Narrow divided	0	2-Low (<5/mile)	-50
3-Center turn lane	-100	3-Medium (5-10/mile)	-100
4-Undivided	-200	4-High (>10/mile)	-200

MASTER ROUTE FILE APPROACH

- Original Method
  - Separate weekday and weekend input routes required
  - Future scenarios required separate route file
- Why?
  - Limit cumbersome management of route file
- DMAMPO Method
  - Master route file approach with future year fields within attributes



Dataview1 - Route System

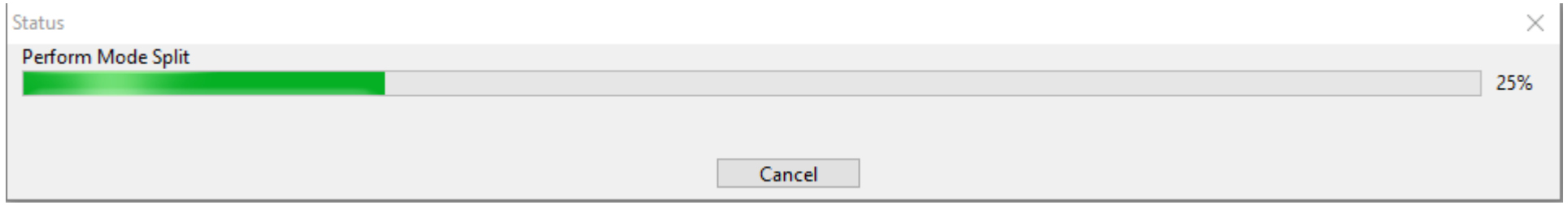
Route_ID	Route_Name	ROUTE	PROJNO1	PROJNO2	PROJNO3	Fare	Fare1	Fare2	Fare3	WDAMHDWY	WDAMHDWY1	WDAMHDWY2	WDAMHDWY3	WEAMHDWY	WEAMHDWY1	WEAMHDWY2	WEAMHDWY3	WDMDH
58	17-Hubbell Ave Hy-Vee & Outlets	1700	--	--	--	1.75	--	--	--	0.00	--	--	--	72.00	--	--	--	
60	Hubbell Moderate	1700	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
67	42-D-Line Downtown	4200	--	--	--	0.00	--	--	--	11.25	--	--	--	30.00	--	--	--	
68	60-University/Ingersoll	6000	--	--	--	1.75	--	--	--	20.00	--	--	--	51.43	--	--	--	
86	03-University	300	--	--	--	1.75	--	--	--	20.00	--	--	--	51.43	--	--	--	
91	Airport	810	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
96	new 86th	2300	12300	--	--	--	1.75	--	--	--	30.00	--	--	--	--	--	--	
98	73-Urbandale/Windsor Heights Flx	7300	17300	--	--	1.75	0.00	--	--	30.00	0.00	--	--	0.00	0.00	--	--	
99	Ankeny Circulator	200	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
100	Ankeny Circulator 2	210	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
102	14-Beaver Ave	1400	11400	--	--	1.75	--	--	--	36.00	--	--	--	60.00	--	--	--	
104	new euclid	5000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
106	04-E 14th St	400	--	--	--	1.75	--	--	--	30.00	--	--	--	72.00	--	--	--	
107	01-Fairgrounds	100	--	--	--	1.75	--	--	--	30.00	--	--	--	72.00	--	--	--	
109	08-Fleur Dr AM	800	--	--	--	1.75	--	--	--	60.00	--	--	--	0.00	--	--	--	
112	carlisle express	9700	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
114	indianola exress	8500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
118	new 14th street	5400	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
119	10-East University	1000	11000	--	--	1.75	--	--	--	60.00	--	--	--	0.00	--	--	--	
120	11-Ingersoll/Valley Junction AM	1100	--	--	--	1.75	--	--	--	60.00	--	--	--	0.00	--	--	--	
121	13-SE Park Ave	1300	--	--	--	1.75	--	--	--	90.00	--	--	--	0.00	--	--	--	

Dataview2 - projlut

PROJNO	DESCRIPTION	COMMITTED	PLANNED	ILLUSTRATIVE	MODEL_IMPACT
19500	98-Ankeny Express PM	2019	2019	2019	yes
19400	93-NW 86th Express AM	2019	2019	2019	yes
19300	93-NW 86th Express PM	2019	2019	2019	yes
19300	73-Urbandale/Windsor Heights Flx	2019	2019	2019	yes
19300	72-West Des Moines/Clive Flx Eas	2019	2019	2019	yes
17300	72-West Des Moines/Clive Flx Wes	2019	2019	2019	yes
17300	52-Jordan Creek #Wells Fargo/Ath	2019	2019	2019	yes
17200	52-Jordan Creek	2019	2019	2019	yes
17200	new 86th	2019	2019	2019	yes
17200	15-6th Ave	2019	2019	2019	yes

NON-MOTORIZED TRIP PROCESSING

- Original Method
  - Used iterations in script to process non-motorized trip tables
- Why?
  - Runtime was about 3-4 hours
- DMAMPO Method
  - Uses matrix computation method to process non-motorized trip tables
  - Runs in minutes
  - Currently only in mode choice step of DMAMPO script

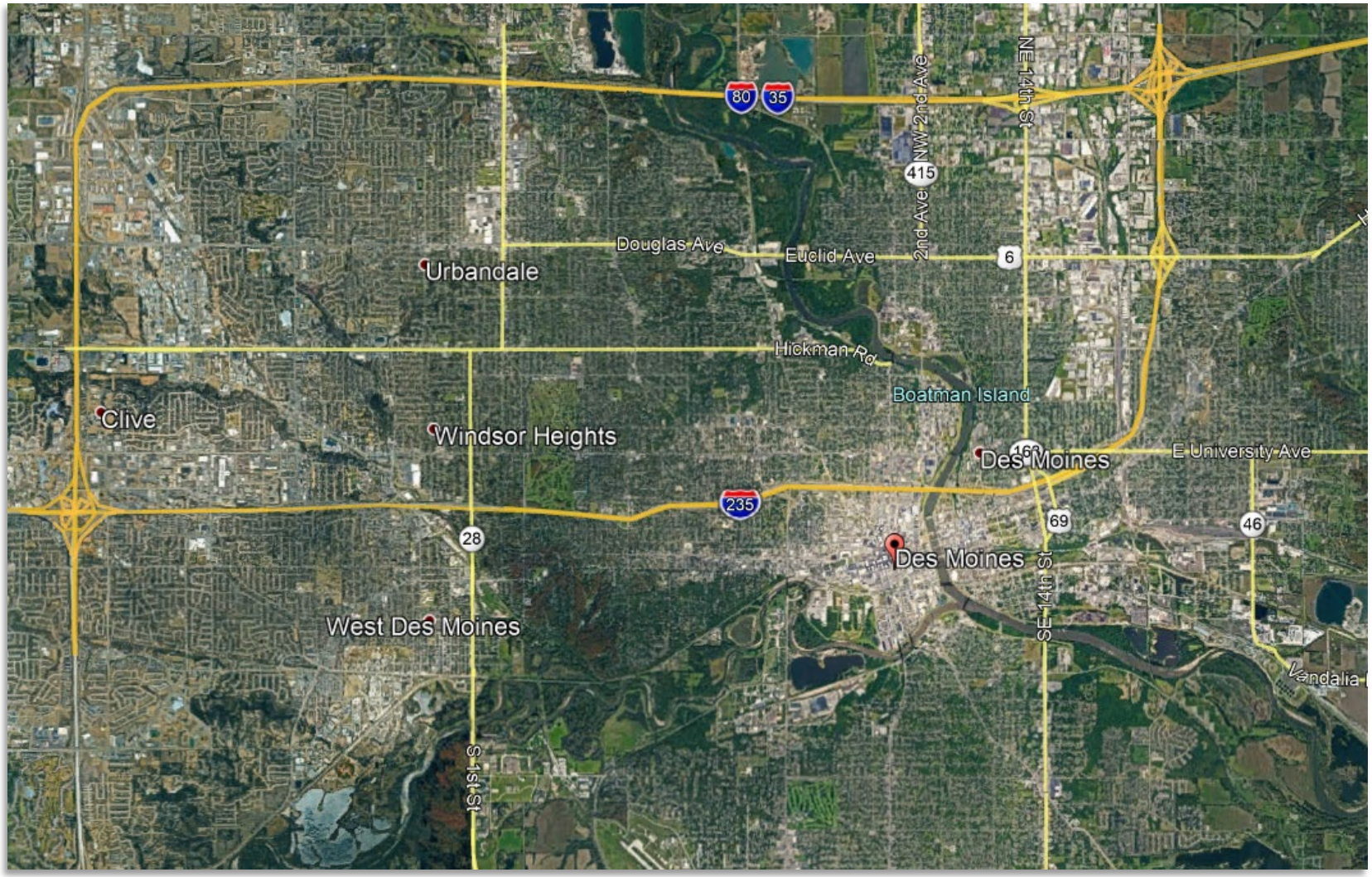


EXPRESS BUS MODE

- Original Method
  - Express buses and local buses skimmed the same
- Why?
  - Express buses and local buses behave differently
  - Desire to improve accuracy of mode choice calibration
- DMAMPO method
  - Gives local and express buses different skim inputs

Dataview2 - modetable

Mode_Name	Mode_ID	Mode_Used	Impedance_Field	Impedance_Weight	Fare_Type	Dwell_Time	Speed	Initial_Time_Walk	Xfer_Time_Walk	Initial_Time_Drive	Xfer_Time_Drive
Local	1	1	TRANSIT_TTIME	1.00	1	0.00	20.00	0.00	0.00	10.00	5.00
Express	2	1	TRANSIT_TTIME	1.00	1	0.00	30.00	25.00	25.00	0.00	20.00


80
35
NE 14th St
NW 2nd Ave
415
2nd Ave
Douglas Ave
Euclid Ave
6
Urbandale
Hickman Rd
Boatman Island
Clive
Windsor Heights
Des Moines
E University Ave
235
69
46
28
Des Moines
SE 14th St
West Des Moines
S 1st St
Vandalia

DISCUSSION?